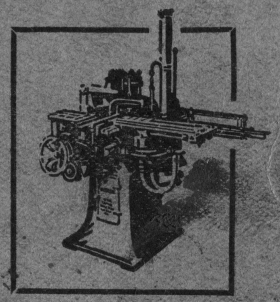
INSTRUCTIONS

for DISMANTLING
ASSEMBLING *and*
ADJUSTING

THE MONOTYPE CASTING MACHINE



ADVANCE PROOFS

1918
LANSTON MONOTYPE MACHINE CO.
PHILADELPHIA

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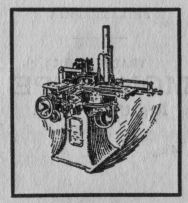

LANSTON MONOTYPE MACHINE CO.
PHILADELPHIA

TRADE MARK
MONOTYPE
Reg. U. S. Pat. Off.

451-10-20-500-MC

INSTRUCTIONS
for
DISMANTLING
ASSEMBLING *and* ADJUSTING
THE MONOTYPE CASTING MACHINE

Dismantling Casting Machine

1. This Casting Machine has been run for a number of months, and recently has been developing some trouble in the Air-pins sticking and the water-ways becoming clogged up with an accumulation of sediment in the water used.

2. There is also a broken Centering-pin and there has been some other troubles that will necessitate the taking out of the Mold-blade-abutment-slide Anvil for examination.

3. This means that this Machine will be taken down as far as it is necessary to go to correct any operating troubles that may arise.

4. Provide a suitable table, bench or box on which to place the parts of the Machine as they are removed.

5. Lower the Swing Frame a37H that carries the Melting Pot 12H, by rotating the Swing-frame-screw Crank-handle 40H2, Plate H2, in right hand rotation, till it seats against the Swing-frame-screw Washer 39H2 and the Swing-frame Guide-block 37H1 has cleared the Guides on the Swing-frame Post 38H.

6. Now swing the Pot from under the Machine by the use of the Swing-frame Handle 37H3, Plate H1, pulling to the right on this Handle and continue to turn the Pot to the right and back to its stop.

7. Turn the Machine until the Pin Jaws a16B and a17B, Plate B1, stand about $\frac{3}{8}$″ apart.

8. The Gear Vernier 20E, Plate H4, will now show about 17 degrees. Then draw forward on the Matrix Case until the head of the Cross-slide-draw Rod 5C1, Plate C1, stands about central between the Matrix Jaws a8C and a9C, Plate C2. Move the Sliding Frame

b9A till the left side comes even with the edge of the Carrying Frame 4A, Plate A1.

9. Remove the Matrix Case a8A from the Sliding Frame b9A by drawing forward on the Fibre Stop 7A, Plate A1, at the same time, with the left hand insert the short screw driver between the Carrying-frame-guide-rod Cross-beam a4A6, Plate A2, and the Centering-pin Lever a16E, Plate E6, and raise up on the screw driver, which with the Fibre Stop withdrawn, will raise the Carrying Frame 4A until the Carrying-frame Guide-rod 4A1 strikes the Bridge Bushing (for the Carrying-frame Guide-rod) 1A6, Plate A1.

10. This raises the Matrix Case, disengaging it from the Cross Slide a5C, Plate C2. The Slide is now pushed to the rear with the right hand and the screw driver removed. The case can now be withdrawn from the Sliding Frame.

11. Disconnect the Bridge Lever a2A, by removing the Bridge-lever-link Pin 3A, Plate A2.

12. Move the Sliding Frame to the right as far as it will go and remove the Bridge Screws 1A1, Plate A1.

13. The Bridge A1 should now be firmly grasped from the under side with the hands, slightly raised a little higher on the left hand, to have the Sliding-frame Draw-rod 9A1, Plate A2, clear the notch in the Matrix Jaw 6B, Plate B1, and by drawing forward so that the Centering-pin-spring Abutment 19A1, Plate A4, clears the Centering-pin Lever a16E, Plate E6. This allows the Bridge to be lifted off the Machine.

14. We will now carefully set the Bridge aside for a time, being careful not to strike the Sliding-frame Draw-rod 9A1 or in any way injure the Bridge. Remove the Basket 9G, Plate G3, and the Winding Spool 21G, Plate G2. Do not allow the Sliding Frame b9A to slide one way or the other as it would hit the end of the Centering-pin and injure it.

15. Now put on a piece of Keyboard Controller Ribbon and punch the 8–H position and with the air turned on, connect the Air-bar-clamping-lever-connecting-rod Connecting-hook 4G1, by pushing it to the right and over the Air-bar-clamping-lever Stud 3G1, Plate G1.

16. Then turn the Machine over to bring the Matrix-jaw Stop-rack d12B, Plate B2, and d12C, Plate C1, to the central position.

17. Then bring the Machine to 80 degrees on the Gear Vernier.

18. Disconnect the Locking-bar Operating-rod a33E from the Locking-bar-cam-lever Stud 34E4, Plate E5,

by pushing forward on the Locking-bar Lever b34E, Plate E7, until the Eye can be raised from the Stud and the Lever pushed further forward so that the Eye rests on the Stud.

19. Remove the Pin-jaws-tongs-spring Connecting-link (long, front) 60E, and the Pin-jaws-tongs-spring Connecting-link (short, rear) 61E, Plate E2, the Pin-jaw-tongs-spring-bell-crank-pin Cotter 58E3, and the Pin-jaw-tongs Spring (complete) 57E, Plate E2.

20. Remove the Pin-jaw-stud Nut and Washer from the Pin-jaw Stud 16B1, Plate B3, 17B1, Plate B1, 18C1 and 19C1, Plate C2, and the Nut and Washer from the Studs 63E, 21E6, 40E, 3D8, 21E2 and 39E, Plate E2.

21. These Tongs can now be lifted from their Studs.

22. With the Machine in the 80 degrees position and the Matrix-jaw Tongs a37E and a38E, Plate E2, standing about square with the B Air-pin Block 3B, Plate B3, and the C Air-pin Block 3C, Plate C3, through the hole in the Tongs, push down the Matrix-jaw-tongs Lock-slide a38E15 and withdraw the Slides by forcing them to the rear on the B Tongs and to the left on the C Tongs.

23. These Tongs can now be lifted from the Matrix Jaws and Studs. Turn the Machine till the Gear Vernier shows 195 degrees.

24. Turn off the water by closing the Water-supply Valve a48H, Plate H5.

25. Remove the Mold-blade-operating-rod-fork Pin 16C6, Plate C1.

26. Remove the three Mold Screws a50E, Plate E1, from the base of the Machine to which they secured the Mold.

27. Remove the Mold Clamps 49E and 89E1, Plate E1. Disengage the Mold-blade-carrier Latch 9ME19M from the Mold-blade-operating-rod Fork b16C5 by pushing to the left on the outer end of the Mold-blade-latch Bell-crank a87E1, Plate A3.

28. The Mold can now be drawn forward, disconnecting it from the Type-carrier d20B, Plate B2. Put the Mold carefully aside lest it become injured. Slack off on both Jaw-tongs-cam-lever Clamp Bolts (for Ball Extension) 24E2, just enough that the Jaw-tongs-spring-box Ball Extension a26E1, can be lifted from the socket in the Jaw-tongs-cam Lever a24E, Plate E7.

29. Remove the Jaw-tongs-bell-crank-fulcrum-stud Nut (upper) 22E2, and the Jaw-tongs-bell-crank-fulcrum-stud Washer, 22E3, Plate E3.

30. Turn the Machine to 60 degrees.

31. The Jaw-tongs Bell-crank (lower) a21E, Plate E2, and the Jaw-tongs Bell-crank (upper) a21E10 are assembled, and can now be removed from the Jaw-tongs-bell-crank-fulcrum Stud 22E, by grasping the Jaw-tongs Bell-crank in the left hand and the body of the Jaw-tongs Spring-box in the right hand and raising the Ball Extension from the Socket in the Jaw-tongs-cam Lever a24E, at the same time raising the Bell-crank from the Stud and carrying it to the right and in an upward position, removing the Jaw-tongs Spring-box and the Jaw-tongs Bell-cranks from the Machine.

32. Now drop the Locking-bar-operating-rod Eye over the Stud in the Locking-bar-cam Lever.

33. Now remove the Type-pusher-eye Cotter 29B7 from the Type-pusher-eye Pin 29B6 and remove the Type-pusher-eye Pin from the Type Pusher 29B, Plate B1, and withdraw the Type Pusher to the rear, bringing it out above the Mold-blade Bell-crank 41E, Plate E1.

34. Turn Machine to 205 degrees and remove two Locking-bar-bell-crank Pins a28E3. Now turn Bell-crank to rear enough for third Pin to clear the Air-pin-block Retaining Plate a3D14. Remove the third Locking-bar-bell-crank Pin. Remove the C Locking-bar. Push the B Locking-bar forward until it engages the teeth in the B Stop-rack.

35. The Locking-bar Bell-crank c28E can now by slightly turning, be removed from the Locking-bar-bell-crank Stud b32E, Plate E1.

36. The Locking-bar d13B is now removed by withdrawing it to the rear.

37. Turn the Machine till the Centering-pin Lever 16E, Plate E6, is at the top of its stroke.

38. This raises the Normal-wedge Locking-pin a14B, Plate B3, from the Normal Wedge 21D, Plate D3.

39. Now push the Wedge to the right, letting it come to rest about one inch from the edge of the Matrix-jaw Latch a7B, Plate B1.

40. Now push to the right on Matrix-jaw-latch Nut 7B3, compressing the Matrix-jaw-latch Spring a7B2. This withdraws the Latch 1/8″ beyond the end of the Matrix Jaw and permits the Matrix-jaw-latch Pin to clear the edge of the Matrix Jaw 5B, when the Matrix-jaw-latch Nut 7B3 is rotated from the rear, raising the Latch and permitting the Normal Wedge to be removed, by drawing forward on the Mold-blade-abutment-slide-spring Post 14C8, Plate C2.

41. Loosen the Pin-jaw-guide-rod Screw a18B1 in the right end of the Pin-jaw Guide-rod a18B, Plate B1. Remove the Matrix-jaw-shoe-packing-block Screws a9B3 and the Matrix-jaw-shoe-packing-block Shoe a9B4.

42. The Pin-jaw Guide-rod a18B can now be pushed from its bearings and the Pin Jaws 16B and 17B removed. Loosen the Expansion Screw in the front end of the Pin-jaw Guide-rod a20C and remove the Pin-jaw-guide-rod-stand-clamp Screw 23C1 and the Pin-jaw Guide-rod 20C can be taken from the Stand and the Pin Jaws 18C and 19C removed.

43. Caution:—In removing the Pin-jaw Guide-rod a20C and a18B be sure the Pin-jaw-guide-rod Stops 19B, Plate B1, and 21C, Plate C1, are not lost.

44. Remove the Matrix-jaw-shoe-packing-block-cover Screw 11B3, which will release the Matrix-jaw-shoe-packing-block Cover 11B2, Plate B1. Remove the Cover.

45. Remove the Matrix-jaw-shoe-packing-block Bolt 11B1, Plate B2. Remove the two Matrix-jaw-shoe Screws (top) 8B1 and the Matrix-jaw-shoe Screw 8B2, the Matrix-jaw Shoe 8B and the Matrix-jaw-shoe Packing Block (left) (small) 10B, Plate B1, can now be removed.

46. Remove the Matrix Jaws a5B and a6B, Plate B1. Remove the Matrix-jaw-shoe Packing Block (right) 11B, Plate B2. Remove the Matrix-jaw Stop-rack d12B, which is now free.

47. Remove the Matrix-jaw-stop Screws 11C1, together with Matrix-jaw Stop b11C, Plate C3, and the Matrix Jaw a9C. Loosen up on the Cross-slide-draw-rod Clamp-screw a5C2, Plate C2, and remove the Cross-slide Draw-rod b5C1, Plate C1.

48. Withdraw the Matrix-jaw Stop-rack d12C, Plate C1, and the Matrix Jaw 8C, Plate C2, from the Channel in the Air-pin Block 3C.

49. Remove the Type-carrier-connecting-rod-fork-eye-pin Cotter 21B8 and the Type-carrier-connecting-rod-fork-eye Pin 21B7 from the Type-carrier-cam-lever Extension a72E4, Plate B1.

50. Remove the Type-carrier-shoe Screws (left) 23B2 and the two Type-carrier-shoe Screws (right and center) 23B1. Raise the Type-carrier-connecting-rod-spring Abutment 21B10, Plate B2, out of the Type-carrier-spring-abutment Stand a25B, Plate H4. Then remove the two Type-carrier-shoe Screws 24B1 together with the Type-carrier Shoe (short) 24B, Plate B3.

51. The Type Carrier d20B, Plate B2, can now be lifted from the Machine.

52. Remove the Justification-wedge-stop-block Screw 19D1 and the Justification-wedge Stop-block 19D, Plate E1.

53. Remove the Justification Wedges 10D and 11D Plate D3, by lifting and drawing them to the left.

54. Remove the Type-transfer-wedge-operating-rod Nuts 63D1, Plate D3, together with the Type-transfer wedge-operating-rod Washer (rawhide) 63D4, Plate D4. Remove the Nuts and Washers from the Space-transfer-wedge Operating-rod 53D, Plate D3. Push to the right on the Type-transfer-wedge Operating-rod 63D, to clear the Transfer Tongs 59D. Now take hold of the Type-transfer Wedge 62D and withdraw it and the Rod out to the right. Now push to the right on the Space-transfer-wedge Operating-rod 53D to clear the Tongs 59D and take hold of the Space-transfer Wedge 52D and withdraw it and the Rod to the right from the Machine.

55. Replace the Mold-blade-operating-rod-fork Pin 16C6, Plate C1. Turn the Machine to 115 degrees, insert a wooden wedge or the heavy screw driver in front of the Pin and push the end of the screw driver through the opening on the base and down through the C Air-pin Block and drop the other end of the driver to the rear of the Centering-pin Lever.

56. This compresses the Mold-blade-operating-rod Ejecting Spring a16C2 on the Mold-blade Operating-rod a16C, Plate C1.

57. With the Mold-blade-operating-rod Nut 16C9 and the Mold-blade-operating-rod-nut Lock-nut 16C15, unscrew the Mold-blade Operating-rod a16C from the Mold-blade-operating-rod Nut a16C16 and withdraw the Mold-blade Operating-rod to the rear with the Nut 16C9 and 16C15 together with the Sizing Spring Mechanism assembled upon it.

58. Carefully remove the screw driver, allowing the Ejecting Springs to push the Mold-blade-operating-rod Fork forward.

59. Remove the Mold-blade-abutment-slide Spring 15C, Plate C2.

60. Remove the Air-pin-block Screws 3C5 and the Cross-slide-extension-shoe Screws 6C1, Plate C2.

61. Now remove the four Cross-slide-guide Screws 7C2, Plate C2, and remove the Cross-slide Guide a7C1, being careful the Ejecting Spring 16C2 does not drive the Mold-blade-operating-rod Fork off the Machine.

62. Now remove the Mold-blade-operating-rod Fork and the forward Ejecting Spring (long), the Mold-blade-operating-rod Nut a16C16 and remove the Mold-blade-abutment Slide 14C.

63. With a suitable spanner loosen the Mold-blade-connecting-rod-ball-socket Nuts 46E1, 47E1, Plate E1. Note this Connecting-rod has right hand threads. Then with the pin wrench inserted in the hole in the Mold-blade Connecting-rod 45E, Plate E1, loosen the Mold-blade-connecting-rod Lock-nuts 45E1 and 45E2, Plate E1, and run them back on the Rod as far as they will go. The Mold-blade-connecting-rod-ball-socket Plugs 46E2 and 47E2 can now be run down on the Rod, permitting the Ball Sockets to be lifted off the Ball in the Cam Lever 44E and the Mold-blade Bell Crank 41E.

64. Now remove the Mold-blade-bell-crank-stud Nut (upper) 42E2 and Washer 42E3 and remove the Pin-jaw-tongs-spring Lever a62E and the Mold-blade Bell-crank from the Mold-blade-bell-crank Stud 42E, Plate E1. Now remove the Mold-blade-operating-rod-ejecting-spring Abutment 16C3 from the Air-pin Block 3C, Plate C1.

65. With a suitable spanner loosen the Type-pusher connecting-rod-ball-socket Lock-nut 78E1. With a suitable wrench applied to the Type-pusher-connecting-rod-ball-socket Lock-nut 77E4, Plate E1, rotate the Rod, unscrewing it from the Ball Socket 78E, until the Socket can be lifted from the Ball. Then remove the Type-pusher Bell-crank 73E.

66. Throw on Pump; turn Machine to 260 degrees and with a rod of sufficient length (18 inches long), remove the Air-pin-plate Dowels. Shut off the Pump and turn the Machine to 115 degrees.

67. Be sure that the Pump is not in action. Remove one Screw from the Centering-pin-lever Plate 16E2, Plate E6, and release the Justification-wedge-lever-arm Rods 15D3, Plate D1, from the Centering-pin Lever a16E, Plate E6. Remove the Normal-wedge-locking-pin-stand Dowels 15B2, Plate B3, and the Normal-wedge-locking-pin-stand Screws 15B3, 15B4, 15B5 and 15B6, Plate B3, and the Normal-wedge-locking-pin-stand Bolt 15B1, Plate B1. The Normal-wedge-locking-pin Stand 15B, Plate B3, can now be removed from the Machine. Remove the Justification-wedge-lever-fulcrum Pin 18D, Plate D2. The Justification-wedge Lever-arms 15D assembled, can now be lifted from the Machine.

68. We will now endeavor to locate this water trouble.

69. Open wide the Water-supply Valve 48H, when the water should flow free from the rear water opening in the base of the Machine where the mold seats.

70. We get no water. Close Water-supply Valve, and remove the three Screws 47H1 from the Water-pipe Connection 47H, Plate H5, and remove Water-pipe Connection from the base of the Machine.

71. Take Air-hose and turn air pressure through the Water Pipe (copper drain from the main stand) a43H3, and Water Pipe (drain from the Mold). At the same time see that the Water-escape Valve 42H is open. If these Pipes are clear the trouble is not here. If the trouble is here in either or both of these pipes, they should be removed and cleaned out.

72. For various reasons we are presuming that the trouble is deeper seated.

73. Turn on the Water-supply Valve 48H again and see if the water comes from the base of the Machine where the Water-pipe Connection was removed. If it does, the Water Ways between this Connection and the two brass seats on the base of the Machine are stopped up. Take No. 30 Drill and drill out these Water Ways and turn the air pressure through to blow out all sediment.

74. No water comes from the base of the Machine. Take the Pump-arm Drill and drill out the Water Way into the base of the Machine. This extends to the left about four inches. If no water now comes, turn off the Water-supply Cock a52H, Plate H5, disconnect the Water-pipe Union 45H9 and apply the air pressure at opening in the Casting-machine base where the Water-pipe Connection was removed.

75. If we get no air through it shows that the trouble is within the Machine. Disconnect the Water-pipe Union (brass) 45H2, nearest the Water-supply Valve 48H, and apply the air as before. If no air comes through the trouble is in the Machine base. Apply the air to the Iron Pipe where the Union was disconnected on the Water Supply and see that with the Water-supply Valve 48H open, that we get air at the last copper union opened. If we do, we are sure that this part of the Machine is clear. Then connect up the Union a45H9 and open the Water-supply Valve and the Water-supply Cock a52H, Plate H5, to see that we get water at the brass union we have opened. If we get water the trouble is in the base of the Machine and it will be

necessary to remove the Galley-cam Stand to overcome the trouble.

76. Remove the Galley-pan Support a18F, Plate F3, by releasing the Galley-pan-shelf Wing-bolt a17F6, Plate F2. Draw forward on the Line-hook Stud 28F, withdrawing the Line Hooks 19F1, from the Type-channel Block a50F.

77. Remove the Type-channel Block (adjustable) a50F, Plate F3, and the Type-channel Block (fixed) a51F, Plate F1. Drive out the Galley-cam-stand Dowel 31F1 and remove the Galley-cam-stand Screws 31F3 and 31F4, Plate F4. Remove the Gear-cover Screw (upper) 19E2, and Gear-cover Screw (lower) 19E1 and remove Gear Cover 19E, Plate E6.

78. Remove the four Cam-shaft-stand-cap Screws 12E9 and the Cam-shaft-stand Cap (for Worm Shaft) 12E8. Remove the Worm Shaft and Hand-wheel 80E2, Plate E5.

79. Note:—Before removing, note that the Gears 10E5 and 11E3 are marked in proper relation to Worm shaft Gear and that the Gears in the Worm Shaft are properly marked as to relation with the Gear. If not, spot them before removing.

80. Remove the Pump Trip (hand) 35H by removing Pump-trip-spring-box Nut 35H8. This allows the Pump-trip Spring-box 35H6 and the Handle 35H7 to be removed.

81. Remove the Pump-trip-rod Nut 35H2 from the Pump-trip Rod 35H1, taking care that the Pump-trip-rod Washer 35H3 is not lost when the Nut is removed, because of the spring pressure in the Pump-trip-spring-box Spring.

82. The Pump-trip-spring-box Spring 35H9 can now be removed.

83. Now loosen the Galley-cam-stand Screw 31F2, Plate F1, and the Galley-cam Stand can now be removed from its shelf on the Main Stand.

84. Note:—Machines equipped with speed device will have to have Interlocking-lever Operat ng-rod 109E1, Plate S3, removed before removing Galley-cam Stand.

85. Note:—This Galley-cam Stand should be carefully blocked up before the last Screw is removed, and the services of another man secured to carefully lift it from the Machine and to assist in replacing it.

86. Remove the Water Connection (front) 79E by removing the two Screws 79E1, Plate E1.

87. Now with the Pump-arm Drill, drill into the water opening at right angles to meet the opening

When removing front of Machine to get at Water Conn. notice a Dowel with Threads— it does not screw out.

from the outlet Water-pipe Connection and turn air pressure through. If this be clear the trouble is still in the base. Drill with the Pump-arm Drill at about 45 degrees to the front of the Stand at the left opening, at the side of the Stand, then apply air, which should open up water-ways. If no air now, the Water-pipe Union 45H2 should be disconnected from the Water Pipe 45H. If air can be forced through the Pipe a45H3, Plate H5, then the trouble must be in Pipe 45H, which trouble can usually be removed by pushing a wire up inside Pipe 45H and applying the air to the opening on the front of the Main Stand. We will now presume that the trouble has been overcome.

88. Remove the Air-pin-plate Screws 4B2, Plate B2, and lift off the Air-pin Plate. Then remove the 14 Air-pin Springs 1B1, Plate B1, and the 15 Air Pins 1B, Plate B1. A similar operation is necessary to remove the Air-pin-plate Springs and Air Pins from the C Air-pin Block. Then remove the short Air-pin Spring from under the left and rear Pin in each Air-pin Block.

89. In removing these Pins it is always best to see that they are so placed that they can be returned to the same position from which they were taken.

90. Remove the Transfer-wedge-shifter-lever-arm Spring 58D, Plate B3, together with the Justification-wedge-lever-arm Springs 16D, by disconnecting them from the Rods and lift off the Justification-wedge-lever-arm-spring Plate 17D, Plate B2, by lifting the Plate from the top of the Air-pin-block-cover-plate Screws 3D3, Plate D2. Remove the Air-pin-block-cover-plate Screws (long) 3D3, Plate D2.

91. Remove the Air-pin-block Set-screw a3D12, and the Bell-crank-fulcrum Pin 7D and the Bell Crank 5D and 4D, Plate D2, and Bell Crank 6D, Plate D1.

92. Now remove the Air-pin-block-cover-plate Screw 3D2, and lift off the Air-pin-block Cover-plate a3D1. Remove the three Air Pins 1D and 2D, Plate D2, being careful that they be returned to the same places.

93. Fill all three Air-pin Blocks with Kerosene or Coal-oil and let it stand about five minutes.

94. Raise the Air Bar (including Valve Body) 2G, Plate G2. Cover Air-tower with thick cloth and take an Air-pin and force it down into each chamber in turn, in each Air-pin Block, which will force the accumulation of paper dust from the openings in the Air-tower-housing Cross-girt 1G5, Plate G2.

95. The larger pistons must be used in cleaning the Air-pin Block (justification) 3D.

96. If these passages are full of matter and cannot be forced open by pushing down on the Air-pin with the fingers, then it may be necessary to increase this pressure by setting a block of wood about one inch square on top of the Air-pin and striking it a blow with the hand. The greatest care must be used in doing this to prevent injury to the Air-pin, Air-pin Block or the Air Pipe.

97. It is presumed that they will show clear and we now cover the Air-pin Blocks with rags and apply the air pressure to each opening in the Air-tower Cross-girt to see that each Pipe is clear and to blow the excess oil from the Pipe. After all the Pipes are opened up, then wipe up all surplus oil from about the Machine.

98. Loosen the Transfer-wedge-spring-box Lock-nut 60D10, next to the Transfer-tongs-space-wedge-lever Eye 59D11, and with a suitable wrench, rotate the Rod in the Spring Box, by means of the Transfer-wedge-spring-box-rod Adjusting-nut 60D8 and Lock-nut 60D9, unscrewing it from the Eye of the Transfer Tongs 59D. Remove the Transfer-wedge-spring-box-stand Bolts 61D1, Plate D3, and remove the Spring Box 60D from the Machine.

Assembling and Adjusting

99. When taking down this Machine we carefully refer to name, number, symbol and plate where a picture of the parts in mind are to be found.

100. In reassembling, we will refer to names only and if a symbol and plate are again required, the Cross Reference will give the symbol and plate and it may be again referred to if necessary.

101. Connect all the open water lines on the Main Stand and replace the Water-pipe Connection and the Water Connection (front).

102. Open the Water-supply Cock and the Water-supply Valve and see that water raises above the Main Stand from the water line where Mold seats. Then shut off the water.

103. Note:—In replacing the Water-pipe Connection and the Water Connection (front); this should be carefully done with red lead to insure no leaks.

104. Replace the Galley-cam Stand by raising it into position on the shelf of the Main Stand. Care must be taken to see that the Pump Trip is in proper position with the Pump-trip-rod Plate standing behind the Pump-trip-rod Operating-lever. With the Galley-cam

Stand in position put in the Galley-cam-stand Screw (1/2″x1–3/8″) at the top of the Galley-cam Stand and draw up to its bearing. Note:—See that the Worm-shaft Oil-pan is in proper position, with the lip to the left.

105. Put in the Galley-cam-stand Dowel and slightly tap it to insure that the Galley-cam Stand is drawn to line. Then put in the other two Galley-cam-stand Screws. Replace the Galley-pan Support.

106. Since we have had off the Worm Shaft and Wheel and the Galley-cam Stand it will be necessary after replacing the Galley-cam Stand to see that it is in proper adjustment.

107. We must adjust this Worm Wheel so that it engages the proper tooth in the Worm.

108. The object of this adjustment is, that when the Galley-cam-driving Pawl is released from the Trip-lever Latch by the Justification-wedge-lever-arm Rod engaging the Centering-pin Lever, that the edge which engages the Galley-cam-shaft Ratchet will fall in the middle of the flat surface on top of Ratchet tooth.

109. This insures that the Line Hook will swing to the right late enough to engage the last type of the line, but not so late that it will not have time to pull it out of the way before the first type of the next line is delivered.

110. Turn the Galley-cam Shaft so that the Galley-cam-driving Pawl rests on the top of the flat of the tooth of the Ratchet. Replace the Worm Shaft so that the Worm-shaft Gear meshes with the Cam-shaft Gears. At the same time see that the Worm Wheel meshes properly with the Worm when the Ratchet is positioned as described; the relation between the three Gears is then correct.

111. This should be tested by engaging the Justification-wedge-lever-arm-rod Adjusting-nut with the Centering-pin Lever, with the Pump Mechanism in operation. Then turn Machine until edge of Pawl 14F1, which engages Galley-stand Ratchet will rest on the middle of the flat surface on top of the Ratchet tooth.

112. By referring to note, Paragraph 79, we have noted the marking of these Gears and the Gear on the Worm-wheel Shaft.

113. Since these markings are made to gauge at our factory it is idle to discuss the possibilities leading to any possible chance of their being in error.

114. Replace the Cam-shaft-stand Cap for Worm Shaft and the four Screws, being careful that this Cap,

does not bind. Draw up the Screws to bearing with the Cap down and turn over the Hand Wheel to see that the Cams are free. Replace the Gear Cover and the two Gear-cover Screws. See that they are tight and the Gear Cover does not interfere with the Gears. Then set up all the Screws tight.

115. Put the Pump-trip-spring-box Nut on the Pump-trip Rod. Put on the Pump-trip-spring-box Spring and compress it so that the Pump-trip-rod Washer and Nut can be put on the Pump-trip Rod and drawn up tight.

116. Replace the Pump-trip Spring-box and Handle over the Pump-trip-rod-spring-box Spring and tighten the Pump-trip-spring-box Nut.

117. The placing of the Pins in either Air-pin Block and re-assembling the Blocks are the same, either for the B or C Block.

118. After the Air-pipes have had all the surplus kerosene blown out of them, the Air-pins should be replaced in the same chamber from which they were taken, each being carefully cleaned before being replaced and separately tested by drawing to the top of the chamber and releasing to see that they fall freely.

119. In the last, or 15–O position on the B and C Air-pin Block it has, of course, been noticed that there is a small Spring under the Pin. This should carefully be put into place and the last Pin put on the top of it. The other Springs are now put over each Air-pin singly of the remaining 28 Pins.

120. The Air-pin Plate is now carefully cleaned and all burrs removed that develop from running with too strong air pressure. The Air-pin Plate is now placed in position over the Air Pins and carefully pushed down over the Pins, care being taken to see that none of the Springs are binding or interfering in any way.

121. After the Plates are down, they should be held in position, the two Dowel Pins replaced putting a drop of oil on each Dowel and forced down with the finger. The four Screws are now put in each Air-pin Plate and brought down just to bearing point. The Dowels are now very slightly tapped down and the Screws set up tight.

122. See that the Justification-wedge-lever Plates 13D3 and 14D3 are tight in the Justification-wedge Levers 13D and 14D, Plate D1.

123. Replace the Justification-wedge-lever Arms with the Justification-wedge Levers assembled. Then put in the Justification-wedge-lever-fulcrum Pin and set it up

tight. Put the Normal-wedge-locking-pin Stand in position and put a little oil on the Dowel Pins and push them down into position. Put in the four Screws and draw them snug. Replace the Normal-wedge-locking-pin-stand Bolt. Tap the Dowels lightly to seat them and tighten the Screws and Bolts. Replace the Justification-wedge-lever-arm Rods in the Centering-pin Lever and replace the Plate and Screw.

124. Place the three Air Pins in the Air-pin Block (justification), using the same care in cleaning and assembling. These Air Pins being heavier, have no Springs to restore them, but are assisted in restoring by the Justification-wedge-lever-arm-rod Springs. Care must be taken to get the two Pins with the shorter shoulder in the outside chambers and the long shoulder Pin in the central chamber.

125. Put on the Air-pin-block Cover-plate and put in the short Screw drawing it only to bearing. Now put in the two long Screws that form the support to the Plate to which the Justification-lever-arm Springs are secured.

126. Now with the air pressure test each Pin in regular order, using a keyboard ribbon, properly perforated, to see that it freely responds to the air, which is applied to each opening in the Cross Girt in the Air Tower. All Pins respond freely, and we now tighten the three Screws in the Air-pin Block (justification) and the four Screws are again gone over in the Air-pin Blocks B and C.

127. The Dowels are now driven down secure in each Air-pin Plate and the test repeated, and if all the Pins are responding freely the work of cleaning the Air Pins is completed.

128. Replace the three Bell Cranks for the Justification and Transfer-wedge-lever-shifter Arms in their proper order and replace the Justification-wedge-lever-fulcrum Pin and Set Screw.

129. Replace the Justification-wedge-lever-arm-spring Plate with the Springs.

130. Replace the Type-pusher Bell-crank and put a little oil on the Ball-stud, drop the Type-pusher-connecting-rod Ball Socket over the Ball-stud in the Bell Crank. Then with a suitable wrench applied to the Type-pusher-operating-rod Lock-nut rotate the Rod till the Ball-plug comes against the Ball and adjust so that it does not bind and is snug without lost motion. Then, with the spanner, lock the Lock-nut.

131. Put in the Mold-blade-operating-rod-ejecting-spring Abutment. Replace the Mold-blade Bell-crank and Pin-jaw-tongs-spring Lever, together with the Washer and Nut. Put a little oil on the Ball in the Bell Crank and the Ball in the Mold-blade Cam-lever. Set the Mold-blade Operating-rod in position with the Ball Sockets over the Balls in the Bell Crank and Mold-blade Cam-lever. Screw the Ball Plugs up till they touch the Balls and adjust so they do not bind, but are snug and have no lost motion. Then lock the Ball-plug Lock-nuts. Then insert the pin wrench in the hole in the Mold-blade Connecting-rod and with a suitable wrench lock the Lock-nuts. This adjustment will have to be made later for proper lengths of this Rod, before operating the Machine.

132. Now take the Mold-blade-abutment Slide and remove the two Screws in the Mold-blade-abutment-slide Anvil, being careful not to lose the three Mold-blade-abutment-anvil Springs, together with the Mold-blade-abutment-anvil Plunger. Carefully examine this Anvil to see that it has no burr on the edge of the Anvil, caused by the Jaw-tong Spring-box being out of adjustment and causing the step of the Normal Wedge to seat on the edge of the Anvil.

133. Now assemble the Mold-blade-abutment Slide by replacing the three Mold-blade-abutment-slide-anvil Springs, the Mold-blade-abutment-slide Plunger, the Mold-blade-abutment-slide Anvil and the two Mold-blade-abutment-slide-anvil Screws. See that the Anvil is properly set up and does not bind the Mold-blade-abutment-slide Plunger.

134. Slack off the Transfer-wedge-spring-box-rod-adjusting-nut Lock-nut 60D8 and the Transfer-wedge-spring-rod Adjusting-nut (for springs) 60D9. This releases the Rod-head from contact with the Spring Abutment 60D11, and the Nut is also withdrawn from the forward Abutment 60D11. This leaves the Rod loose in the Spring Box. Remove the Transfer-wedge-spring-box Cap 60D2. The Springs and Rod with the Abutments can now be withdrawn from the Tube.

135. Clean up these parts and properly lubricate them. Insert the Springs, Spring Abutments and Rod, assembled, into the tube. Replace the Cap. Advance the Adjusting-nut so that it just touches the Spring Abutment. This draws the Rod-head against the other Abutment, further tightening this Nut compresses the Springs, leaving lost motion in the Box. The adjustment must be so made that there is no lost motion in

the Box and the Nut and Rod-head are firm against the Spring Abutments. Lock the Lock-nut tight.

136. Replace the Transfer-wedge Spring-box in place on the Main Stand and secure the Transfer-wedge-spring-box-stand Bolts. With a suitable wrench by means of the Adjusting-nut and Lock-nut, rotate the Rod, screwing it into the Transfer-tongs Eye. This should be run in about 3/8 of an inch and the Lock-nut locked and the adjustment of Tongs properly made before operating the Machine.

137. Replace the Mold-blade-abutment Slide.

138. Replace the forward Ejecting Spring (long).

139. Take the Mold-blade Operating-rod, with the Mold-blade-operating-rod Sizing Spring mechanism attached, and secure it in a vise, then with the gas pliers compress the rear Mold-blade-operating-rod Sizing Spring and remove the Mold-blade-operating-rod Lock-nut and the Mold-blade-operating-rod Nut. Now remove all the Mold-blade-operating-rod-sizing Springs mechanism from the Mold-blade-operating Rod.

140. Screw the Mold-blade-operating-rod Nut (front) on the front end of the Mold-blade Operating-rod and test to see that the Rod is straight and the Nut square with the Rod.

141. Remove the Nut, and put the Mold-blade Operating-rod in place and compress the Ejecting Spring, which is now on the Rod with the Mold-blade-operating-rod Fork and force the Fork into position and push the Mold-blade Operating-rod into the rear of the Fork. Replace the square Mold-blade-operating-rod Nut (front) with the slot in the Nut to the front to clear the Mold-blade-abutment-slide-adjusting-screw Lock-spring, and tighten the Rod into the Nut.

142. Place the Cross Slide and Cross-slide Guide in position and put in the Cross-slide Screws. See that the Cross-slide Guide is not binding and the Mold-blade-operating-rod Fork and that the Mold-blade Abutment can be freely moved by pushing back on the Mold-blade-abutment-slide-spring Post. Tighten these four Screws.

143. Put in the Mold-blade-operating-rod-fork Pin.

144. Turn the Machine to 110 degrees and insert the large screw driver before the end of the Mold-blade-operating-rod Fork forcing it to the rear till the opening appears in the Air-pin Block. Force the screw driver down further and carry the top to the rear to engage the rear of the Centering-pin Lever.

145. Now assemble the Mold-blade-operating-rod Sizing mechanism by first putting on the Mold-blade-operating-rod Distance Sleeve (flat), the Mold-blade-operating-rod-sizing-spring Abutment (front), Mold-blade-operating-rod-sizing-spring Sleeves (inside and outside) and the Mold-blade-operating-sizing Spring.

146. Grip the Mold-blade-operating-rod-sizing-spring Abutment (rear) between the jaws of the gas pliers and compress the Mold-blade-operating-rod Sizing-spring by pushing forward with the pliers until the Abutment is forced forward far enough to start the Mold-blade-operating-rod Nut, which can then be screwed up tight, then back off ¼ turn of Nut and lock the Mold-blade-operating-rod-nut Lock-nut up tight. Remove the screw driver.

147. Replace the Cross-slide-extension Shoe, the four Cross-slide-extension-shoe Screws and the Air-pin-block Screws.

148. Replace the Mold-blade-abutment-slide Spring.

149. Slide in the Matrix Jaw (front) and screw the Draw Rod (rear) in the Cross Slide to the approximate position, at which it should be set.

150. Replace the rear Matrix-jaw Stop-rack and the rear Matrix Jaw. Replace the Matrix-jaw Stop (rear) and put in the two Matrix-jaw-stop Screws and draw them tight. See that the Matrix Jaws work freely with the Stop Rack the full length of its channel. Apply a little oil to this Stop Rack and the Matrix Jaws.

151. The length of B or front Locking Bar is fixed in the manufacture and is 5–11/16″ long from the center of the eye to the end of the tooth.

152. Adjust the length of the rear Locking Bar to 7–9/16″ long from the center of the eye to the end of the tooth.

153. Put the front Stop Rack in position and the front Locking Bar, sliding it forward until it seats in the bottom of the Stop Rack. Replace the Locking-bar Bell-crank and the rear Locking Bar and put in the Pins through the Bell Crank into the Locking Bars and Locking-bar-operating-rod Eye. The teeth in the Locking Bar extends 3/16″ into the Stop Rack.

154. We will now adjust the Locking-bar Operating-rod to have the proper clearance of Stop Racks and Locking Bars, when Locking Bars are withdrawn.

155. With the Machine at 212 degrees, make the length of the Locking-bar Operating-rod such, that the end of the tooth in the front Locking Bar is withdrawn 1/16″ beyond the top of the tooth in the front Stop

Rack. This is accomplished by backing off on the two Locking-bar-operating-rod Nuts and adjusting the length of the Rod between the Eyes to make the proper length. Note.—This Rod has right and left hand threads.

156. Then lock up the Lock-nuts and see that you still have the 1/16″ clearance between the end of the teeth on the front Locking Bar and the Stop Rack.

157. Replace the Matrix-jaw-shoe Packing Block (left, small), the Matrix-jaw-shoe Packing Block (right), the Matrix Jaw (right), the Matrix Jaw (left) and the Matrix-jaw Shoe.

158. Replace the Matrix-jaw-shoe-packing-block Bolt. The Matrix-jaw-shoe Screw (rear) and the two Matrix-jaw-shoe Screws (top).

159. See that the Matrix Jaws can be moved freely with the Matrix-jaw Stop-rack. Put a little oil on these Matrix Jaws and the Stop Rack. Replace the Matrix-jaw-shoe-packing-block Cover and the Matrix-jaw-shoe-packing-block-cover Screw.

160. Now examine the Jaw-tong Bell-crank and see that the Jaw-tong-bell-crank Ball Stud A21E11 and A21E1 are tight in the Bell Crank, and in good condition. Put a little oil in each Jaw-tong-spring-box Ball Socket a18E and a27E, Plate E3.

161. See that the Jaw-tong-spring-box-ball-socket Lock-nuts are tight, and that the Bearings are not binding on the Bell-crank Studs.

162. Then examine the condition of the Jaw-tong-spring-box Ball Extension a26E1, the Jaw-tong-spring-box Ball Socket (left bearing for Ball) a26E2, and the Jaw-tong-spring-box Ball Plug (right bearing for Ball) a26E6 to see that they are in good condition and clean.

163. Put a little oil in the Ball Socket and work the Ball Extension back and forward in the inverted position to see that it is thoroughly lubricated. Lay this Jaw-tong Spring-box together with the Jaw-tong-spring-box Bell-crank assembled, aside for a few minutes and we will finish reassembling the parts of the Machine that go under the Spring Box.

164. Replace the Type Pusher, the Type-pusher-eye Pin and the Type-pusher-eye-pin Cotter. Replace the Type-transfer-wedge Operating-rod (with the notch to the bottom) and the Type-transfer Wedge, being sure that the Type-transfer-wedge-operating-rod Washer (rawhide) and the Nuts are set up properly, and that the Rod passes through the Transfer-wedge Shifter.

165. When tightening the Nuts on the Rod be sure that the Rod is not twisted and will lay flat on the Main Stand after the nuts are tight.

166. Turn the Machine over slowly one revolution to be sure that the notch in the Type-transfer Rod is carried past the Transfer-wedge Shifter. Turn the Machine to 220 degrees. Then bring the Transfer-wedge-shifter-lever-arm Rod forward so that the Adjusting-nut engages the top of the Centering-pin Lever, and turn the Machine until the Centering-pin Lever is at the top of its stroke at 40 degrees. Then the Shifter will engage the notch in the Type-transfer Operating-rod which will permit the Shifter being raised so that it clears the Space-transfer-wedge Operating-rod.

167. Put in the Space-transfer-wedge Operating-rod (with the notch at the top) and couple it up to the Space-transfer Tongs in the same manner and using the same care as in putting in the Space-transfer Operating-rod.

168. Replace the Justification Wedges, the Justification-wedge Stop-block and the Justification-wedge-stop-block Screw.

169. Turn the Machine to 212 degrees and move the Matrix Jaws (both back and front) to the central position between their stops. Turn the Machine to 60 degrees and replace the Jaw-tongs Bell-crank and Spring Box, which we just laid aside. When properly down in position on the Jaw-tong-spring-box-fulcrum Stud and the Jaw-tong-spring-box Ball Extension properly down to its stop on the Jaw-tong Cam-lever, put a little oil on the Jaw-tong-bell-crank-fulcrum-stud and replace the Jaw-tong-bell-crank-fulcrum-stud Washer and Nut and see that they are set up tight.

170. Draw up secure on the Jaw-tong-cam-lever-ball-extension-clamp Bolts. Turn the Machine one revolution by hand to see that the Jaw-tong Bell-cranks have the proper amount of oscillation, which, of course, must be the same for both Bell Cranks. This is determined by raising and lowering the Ball Extension. See that the lower Bell Crank clears the Pin-jaw-tong Stud (rear in Main Stand) about 5/16 inches, that the Jaw-tongs-bell-crank Retaining Block A21E12 has clearance between its front and the Air-pin-block Shoe (for front Locking Bar) a3D6. These points we will presume to be correct. Turn the Machine to 60 degrees. Replace the front and rear Matrix-jaw Tongs being sure that the Matrix-jaw-tong Lock-slide A38E11 and A38E15 are in the rear position. Then crowd these Lock Slides

forward. Replace the Pin Jaws, Pin-jaw Guide-rods and Screws, the Pin-jaw Tongs and put on all Washers and Nuts for the Matrix-jaw Tongs. Replace the Matrix-jaw-shoe-packing-block Shoe and Screw.

171. Replace the Pin-jaw-tongs-spring-connecting Links (long and short). Replace the Basket and Winding Spool.

172. Now take a look at the Type Carrier and see that it is clean and that the Type Clamp and Type-support Spring are working properly, and that the Type Clamp is not bent, or Connecting Rod or Extension Springs broken. Turn the Machine to 20 degrees.

173. Drop a little oil on the bearings for the Type Carrier and put in position.

174. Put the Type-carrier Shoe (long) into position and secure the three Screws, drawing to bearing, see that the Type Carrier can be moved the entire length of stroke without binding, moving it by hand. Then tighten Screws.

175. Replace the Type-carrier Shoe (short) and secure it to bearing with the two Screws; see that the Carrier still moves the entire length. Drop a little oil on the Carrier behind the Shoes. Replace the Type-carrier-connecting-rod-fork-eye Pin and Cotter. Turn the Machine two or three revolutions by hand.

176. Replace the Sorts Tray and the Galley-pan Support and secure them to position.

The Bridge

177. We will now take down the Bridge and replace the Centering-pin. This work should be done on a nearby bench, and the greatest care should be used in handling the Bridge in order that no injury be done to the Draw Rod, Centering-pin or light working parts.

178. Place the Bridge upon its feet on the bench and remove the Bridge-bracket Springs a10A10, Bridge-lever-fulcrum Pin 2A5, the right Bridge-bracket-link-pin-yoke Nut and Washer 17A4 and 17A5, Plate A4, the Centering-pin-spring-abutment-lever-stud Cotter 20A7, Plate A4, the Bridge-bracket-yoke-stud Cotter 16A5, Plate A5, and the Bridge-bracket-yoke Link (right) 17A2, Plate A3.

179. Remove Centering-pin-spring-abutment-lever-fulcrum-pin Nut 21A4 and its Washer 21A5, Plate A3.

180. Remove the Centering-pin-spring-abutment-lever-fulcrum-pin Nut 20A4 and its Washer 20A5, and

the Centering-pin-spring-abutment Lever (lower) (right) 20A2, Plate A3, and the Centering-pin-spring-abutment Lever (upper) (right) 21A2, Plate A3.

181. Remove the Carrying-frame-guide-rod-oil-cap Screws a4A5, and the Oil Caps a4A4, Plate A1. Remove the Carrying-frame-guide-rod-cross-beam Nuts 4A7, Plate A1.

182. Now push the Centering-pin-abutment Levers (left) 20A1 and 21A1 from the Centering-pin-spring-abutment-lever-fulcrum Pins 20A2 and 21A3, Plate A4.

183. Break the setting of the Centering-pin-lifting-link-adjusting-screw Lock-nut 31A6, Plate A4, and run the Centering-pin-lifting-link Adjusting-screw (outside) up about ½ inch.

184. Remove the lower Centering-pin-auxiliary-lever-fulcrum-link-eye-bolt Nut 30A4, Plate A4.

185. By lifting straight up on the Carrying-frame-guide-rod Cross-beam, the Centering-pin, Bridge Lever, Centering-pin Lifting-link 31A1 and the Centering-pin Auxiliary Lever can now be withdrawn from the Bridge.

186. Turn this mechanism upside down with the Centering-pin-lifting-link Adjusting-screw on the bench and compress the Centering-pin Spring 18A2 by forcing down on the Centering-pin-spring Abutment (lower) 18A1, till the lugs on the Abutment can be cleared through the opening on the Centering-pin Lifting-links.

187. The Centering-pin is now disengaged from this mechanism together with the Centering-pin-spring Abutment (lower). Remove the Centering-pin Nut 28A3, Plate A3, when the Centering-pin can be removed from the Abutment.

188. Lay this mechanism all aside.

189. Unhook the Fibre-stop Spring 7A1.

190. Remove the Carrying-frame-guide-rod-stop-nut Lock-nut 4A3, the Carrying-frame-guide-rod-stop Nuts 4A2, being careful that the Carrying Frame and Sliding Frame are not injured when they drop out of the Bridge Bushing (for Carrying-frame Guide-rod) 1A6.

191. Remove the Centering-pin-stand Bolts 6A3 and Washers 6A4.

192. This releases the Centering-pin Stand which can be withdrawn from the Bridge as soon as the Centering-pin-micrometer-screw Plunger 33A8 and the Centering-pin-aligning-lever Plunger are withdrawn past the opening in the Bridge. The Centering-pin Stand is now forced down and out of the Bridge.

Fitting Centering Pin

193. Now take the new Centering-pin and place it in the Centering-pin-spring Abutment (lower) 18A1, being sure that the key pin in the top of the Centering-pin is properly entered into the key way in the Abutment. Put on the Centering-pin Nut 28A3 and tighten it up tight. Adjust the Centering-pin in the Centering-pin Stand a6A, by use of the Centering-pin Nut a6A22, for the lower bearing of the Pin and the Centering-pin-stand-bushing Adjusting-nut 6A7, for the upper bearing of the Pin, so that the Centering-pin can work free without shake. When the Bushing is properly adjusted to the Pin see that the Nuts are both tight. Remove the Centering-pin-aligning-lever Spring 35A and put the Centering-pin Stand in the Bridge and secure it with the two Centering-pin-stand Bolts, being sure that the Centering-pin-stand Plungers are in place, then replace the Centering-pin-aligning Spring.

194. Put the Carrying Frame and Sliding Frame in position and replace the two Carrying-frame Raising-springs 4A12 and put on the Carrying-frame-guide-rod-stop Nuts 4A2, and the Carrying-frame-guide-rod-stop-nut Lock-nuts 4A3.

195. Reassemble the Cross-beam-bridge Lever and Auxiliary Lever and take the Centering-pin with the Centering-pin-spring Abutment (lower) and the Centering-pin Spring and put it in place in the Centering-pin Lifting-links and run the Centering-pin-lifting-link Adjusting-screws 31A5, down till the Lock-nut 31A6 just touches the Centering-pin-lifting-link Yoke, then tighten Nut with fingers. This Centering-pin mechanism can now be returned to the Bridge and the Carrying-frame-guide-rod-cross-beam Nuts put in place and tightened up. Then put on Carrying-frame-guide-rod Oil-cap a4A4 and the Screws a4A5.

196. Insert the Centering-pin-auxiliary-lever-fulcrum-eye Bolt 30A3 into its proper place in the Bridge and replace the Nut 30A4.

197. Replace the Bridge-lever-fulcrum Pin a2A5 and Cotter, and hook up the Fibre-stop Spring 7A6.

198. Bring the Centering-pin-spring-abutment Levers (upper) (left) 21A1 and (lower) (left) 20A1 up into position and fit over the Studs in the Centering-pin-spring Abutment (upper) 19A1 and 18A1, being sure that at the same time the Bridge-bracket-yoke-link Pin is in the proper place in the Lifting-tube-operating-fork-spring-rod Eye 24A8. Replace the Centering-pin-

spring-abutment Levers (upper) (right) 21a2 and (lower) (right) 20A2, together with the Nuts 21A4 and 20A4 and Washers 21A5 and 20A5. Replace the Bridge-bracket-yoke Link (right) 17A, the Cotters 20A7, the Nut 17A4 and Washer 17A5. Replace the Bridge-bracket Springs a10A10. See that the Nuts are all tight and that a little oil has been put on all the bearings of the small working parts.

199. The Bridge is now ready to be put on the Casting Machine to be adjusted, and the regular Caster Adjustments taken up.

Adjustments

225. We have taken down the Casting Machine and reassembled it, with the idea in view of establishing a uniform way of doing this work, so that men can work together, after they have had instructions and each be sure of the steps the other man has gone through to bring his work to a certain point.

226. We will now presume that the Casting Machine has been taken down, that is, all the parts taken off, as we have shown in the foregoing paragraphs and it is now our purpose to reassemble it and readjust the Machine, without going into the details of assembling, but giving particular attention to the adjustments of each part that has a special duty to perform and the time it is doing this work, in relation to the part of a revolution the Machine may have moved through.

227. We will endeavor to give a clear reason for everything done, because, to a man working on a Machine new to him, unless he knows **why** he is doing a thing, he is working in the dark and the only reason he can give for doing it, is because the book told him so, which is no reason whatever.

228. No adjustments can be made without an object in view, so we shall first state the adjustment we want to make, the object of making the adjustment and the quickest and best method of making that adjustment. When an adjustment is once made correctly do not change it. The troubles you have, if any, are due to some other adjustment being out. Find which one it is.

Locking Bars

229. The Locking Bars are operated through the
b86E Locking-bar Cam
b34E Locking-bar-cam Lever

b33E Locking-bar Operating-rod
b33E7 Locking-bar-operating-rod Spring
d28E Locking-bar Bell-crank
d13B Locking Bar
c13C Locking Bar

230. The object of these adjustments, of which there are three, two of which are considered together, is:

First: To have the Locking Bars properly clear the Stop Rack.

Second: That the Locking Bars will be seated in the Stop Rack with equal spring compression.

231. The "B" or front Locking Bar, is of fixed length in manufacture, about 5-11/16″ long, from end of tooth to center of Eye.

232. The "C" or rear Locking Bar is adjusted through

c13C Locking Bar (rear)
a13C11 Locking-bar Yoke
a13C10 Locking-bar-stop Washer
a13C8 Locking-bar Spring
a13C6 Locking-bar-connecting-rod Lock-nut
a13C7 Locking-bar-connecting-rod Washer
a13C4 Locking-bar Connecting-rod
a13C5 Locking-bar-connecting-rod Adjusting-nut
a13C9 Locking-bar-spring-abutment Pin

233. This Bar is adjusted to 7-9/16″ from the center of the Eye to end of Tooth. This insures there will be no danger of jamming the Locking Bar if the Machine is turned a revolution before the adjustment is completed.

234. With the Stop Racks, Locking Bars and Bell Cranks properly assembled and connected to the Locking-bar Operating-rod, back off on the two Locking-bar-operating-rod-eye Lock-nuts a33E2 and a33E6.

235. Turn the Machine to 212 degrees and with the Pin Wrench inserted in the hole about 1½″ from the right end of the Locking-bar Operating-rod, make the length of this Operating Rod of such length that the end of the tooth, in the front or B Locking Bar, will clear the top of the tooth in the Stop Rack by 1/16″. Then carefully set up the two Lock-nuts and see that the clearance still holds.

236. With the Locking Bar adjusted to the 7-9/16″ length from the end of the Tooth to the center of the Eye, the compression on the Springs will be about equal and no further alterations will be necessary.

Paper Tower

237. The Paper Tower is the controlling mechanism of the Casting Machine. In short, it causes the Matrix Case to follow the motion of the keyboard operator's hands so far as the location of the characters and spaces are required to fill and properly justify the line.

238. The Paper Tower is a group of separate mechanisms, each carrying its own adjustments, but directly related to each other, so far as action is concerned. It consists of the Main Operating-rod, Paper-feed-pawl Ring, Air-bar-clamping-lever Connecting-rod, Air-bar Valve, each having an independent adjustment.

239. It is operated through

52E and 52E1 Paper-tower Cam
53E Paper-tower-cam Lever
53E5 Paper-tower-cam-lever Stud
54E1 Paper-tower-operating-rod Eye (long)
54E2 Paper-tower-operating-rod-eye Lock-nut (right hand)
54E Paper-tower Operating-rod
54E4 Paper-tower-operating-rod-eye Lock-nut (left hand)
54E3 Paper-tower-operating-rod Eye (upper)
19G Paper-tower Lever
17G Paper-tower Spring-box
4G Air-bar-clamping-lever Connecting-rod
3G1 Air-bar-clamping-lever Stud
3G Air-bar Clamping Lever
2G Air Bar
2G8 Air-bar Valve
1G5 Air-tower-housing Cross-girt
18G2 and 18G Paper Tension Bars
2G2 Air-bar Packing (leather)
13G Paper-feed Pawl
20G4 Pin-wheel Ratchet
14G Paper-feed-pawl Ring
23G Winding-spool Driving Ratchet
23G3 Winding-spool-driving-ratchet-pawl-arm Operating-finger

The Main Operating Rod

240. For the Main Operating-rod there is but one adjustment; Length. Turn the Machine to 120 degrees in adjusting the length of this Rod.

241. OBJECT:—That the compression on the Paper-feed Spring-box may be the same at the end of the up

stroke of the Rod as it is at the end of the down stroke, when the Pin-wheel Ratchet is feeding.

242. Slack off the upper Operating-rod Nut and the Operating-rod Nut at the lower end of the Rod. Raise the Paper-feed Locking Lever, releasing the Paper-feed mechanism.

243. Then rotate the Paper-tower Operating-rod to increase or diminish the compression in the Spring-box. This Rod is provided with right and left hand threads and after the proper compression is obtained the Lock-nuts should be locked up tight. It is, of course, noted that the bend in this Rod must be to the rear, in order to properly clear the Jaw-tongs Spring-box. If with the Rod so set, the compression is not equal, there should be the greater amount on the down stroke.

Paper Feed Pawl Ring

244. The Paper-feed-pawl Ring has two adjustments; First, limitation of left hand rotation. Second, limitation of right hand rotation. First. OBJECT:—That the Paper-feed Pawl (locking) (upper) may be able to drop in the Pin-wheel Ratchet without drag, after the Ratchet has been rotated by the Paper-feed Pawl (feeding, lower) as far as the right Stop Screw, which limits the left hand rotation of the Paper-feed-pawl Ring, will permit.

245. The Tower is so built that when the Locking Pawl enters the Ratchet as described, the Pins on the Pin Wheel will line with the Hole in the Cross-girt.

246. Turn the Machine slowly until the lug on the Pawl Ring comes in contact with the Stop Screw in the Air-tower Housing. Note that the Stop-screw Lock-nut is set up tight. Turn the Machine to 10 degrees.

247. If then, the Tooth of the Paper-feed Pawl (locking, upper) drags on the side of the Tooth of the Ratchet to the left of it, the Stop Screws must be slacked off to allow the Ratchet to be rotated further by the Paper-feed Pawl (feeding, lower). If the Tooth drags on the Ratchet Tooth to the right of it, the right hand Stop Screw must be screwed in to prevent the Ratchet rotating so far.

248. To complete the adjustment, set up the Stop-screw Lock-nuts tight and see that the two Paper-feed Pawls seat in the Tooth in the Ratchet without drag when the lug on the Paper-feed-pawl Ring strikes either Stop Screw. These adjustments are very important to prevent wear.

249. Second. OBJECT:—That the Paper-feed Pawl (feeding, lower) may be able to drop in the Pin-wheel Ratchet without drag, after the Paper-feed-pawl Ring has been rotated as far to the left as the left hand Stop Screw will permit. Turn the Machine slowly until the lug on the Paper-feed-pawl Ring comes in contact with the left hand Stop Screw, with its Lock-nut set up tight. Turn the Machine to 45 degrees.

250. If the Paper-feed Pawl (feeding, lower) now drags on the lower side of the Tooth of the Ratchet, in which it falls, the Stop Screw must be slacked off to permit the Pawl Ring to rotate further. If it drags on the upper side of the Paper-feed-pawl Tooth the Stop Screw must be screwed out. Then test both adjustments after the Lock-nuts have been set up on the Stop Screws to see that each Pawl in turn seats without drag. The Paper-tower Operating-rod adjustments must be correct before attempting either of these adjustments and should be checked after these adjustments are made. Test as before.

Air Bar Clamping Lever Connecting Rod and Air Bar Valve

251. The Air-bar-clamping-lever Connecting-rod and the Air-bar Valve adjustments should be considered together since they are so closely related.

252. The Air-bar Valve admits air to the Cross-girt through the openings in the Leather Packing. The Valve should be cleaned regularly and kept in good working condition. The Valve opens and closes at each revolution of the Casting Machine and is opened a period of 7/18 of the time of each revolution of the Caster.

253. There are two adjustments to consider in connection with the Air-bar-clamping-lever Connecting-rod.

FIRST: Position at lower end of Stroke.

SECOND: Position at upper end of stroke.

254. OBJECT:—That the Air-bar Clamping-lever may move down far enough after the Air Bar has been seated on the Cross-girt, to insure that the pressure of the Air-bar Springs is sufficient to hold the Air Bar firmly on the Girt and prevent air from escaping under the Leather Packing. That the Clamping Lever may not lift so high that the clearance between the Leather Packing and the Cross-girt is enough to allow the paper to work off the Pin Wheels. The object of the Air-

bar Valve adjustment is: That the air may be admitted to the Air Channel in the Air-bar Leather Packing just as the Bar is seated on the paper, and that the Valve may be opened wide enough to insure a full supply of air.

255. FIRST: Loosen up the Air-bar-clamping-lever-screw Lock-nut and the Air-bar-clamping-lever Screw, the Air-bar-spring Stud-nuts and Lock-nuts, the Air-bar-clamping-lever-connecting-rod-connecting-hook Lock-nut, the Air-bar-clamping-lever-connecting-rod-connecting-link Lock-nut, the Air-bar-clamping-lever-connecting-rod-adjusting-sleeve Lock-nut and the Air-bar-clamping-lever-connecting-rod Adjusting Sleeve. Make the end of the Air-bar-clamping-lever Screw stand 5/32″ below the bottom of the Air-Bar Clamping Lever. Lock the Lock-screw.

256. See that the Paper-feed Locking-lever is released. Hook the Air-bar-clamping-lever-connecting-rod Connecting-hook over the Air-bar-clamping-lever Stud and turn the Machine till the Paper-feed Operating-rod is at the top of its stroke. Screw down on the Air-bar-spring-stud Nut (rear), carrying down with it the Air-bar Clamping-lever till one thickness of keyboard paper just pulls between the Air-bar-clamping-lever Screw and the Air-bar Valve. Lock its Lock-nut. Then screw down the front Air-bar-spring Nut until it just touches the Air-bar Clamping-lever and lock its Lock-nut.

257. Unhook the Air-bar-clamping-lever-connecting-rod Hook and put three thicknesses of keyboard paper between the Leather Packing and the Cross-girt. Hook the Hook over the Stud again. Turn the Machine forward till a piece of keyboard paper just pulls between the lug on the Pawl Ring and the right hand Stop Screw in the Housing. Move the Air-bar-clamping-lever Connecting-rod by means of the Air-bar-clamping-lever-connecting-rod Adjusting Sleeve, locked with its Lock-nut, in or out of the Air-bar-clamping-lever-connecting Hook and the Connecting Link, through the right and left hand threads, till the three thicknesses of keyboard paper just pull between the Leather Packing and the Cross-girt. Lock the Adjusting-link and Connecting-hook Lock-nuts. Then adjust the Air-bar-clamping-lever-connecting rod Connecting Sleeve to give two points clearance between the Air-bar-clamping-lever-connecting-rod Washer and the Air-tower Housing. Lock the Lock-nuts.

Jaw Tong Spring Box

258. To most operators the adjustment of the Jaw-tong Spring-box is a mystery. Something hard to understand and the reason for its dependable action is very often attributed to the fact, that the operator being afraid of it, lets it alone as he finds it and for this reason avoids trouble.

259. The adjustments of the Spring Box should be checked every week, but by this it is not meant that the adjustment should be disturbed, but to see that the Matrix Jaws are closing properly and staying closed the proper period of time, and that the Pin Jaws are in proper adjustment and the Spring Box properly oiled and no bearings cut or worn from lack of oil.

260. The Jaw-tong Spring-box is operated from

23E and 23E1 Jaw-tongs Cams
a24E Jaw-tongs-cam Lever
a26E1 Jaw-tongs-spring-box Ball Extension
a26E2 Jaw-tongs-spring-box Ball-socket (left bearing for Ball)
a26E4 Jaw-tongs-spring-box-ball-socket Plug
a26E5 Jaw-tongs-spring-box-ball-socket Button
a26E6 Jaw-tongs-spring-box-ball Plug (right bearing for Ball)
26E25 Jaw-tongs-spring-box-tube Cap
a26E10 Jaw-tongs-spring-box Springs (outside)
a26E9 Jaw-tongs-spring-box Springs (inside)
a26E11 Jaw-tongs-spring-box-spring Abutments
a26E12 Jaw-tongs-spring-box-spring Brake (wood)
a26E13 Jaw-tongs-spring-box-spring-brake Cone
a26E28 Jaw-tongs-spring-box-tube Plate
a26E17 Jaw-tongs-spring-box-spring Rod (upper)
a26E21 Jaw-tongs-spring-box-spring-rod Cross-head
a26E22 Jaw-tongs-spring-box-spring-rod-cross-head Ball Plug
a26E18 Jaw-tongs-spring-box-spring-rod Lock-nut (Cross-head End)
a26E23 Jaw-tongs-spring-box-spring-rod-cross-head-ball-plug Lock-nut
a26E14 Jaw-tongs-spring-box-spring Rod (lower)
a21E Jaw-tongs Bell-crank (lower)
a21E10 Jaw-tongs Bell-crank (upper)
22E Jaw-tongs-bell-crank-fulcrum Stud
Xa37E Matrix-jaw Tongs (front)
Xa38E Matrix-jaw Tongs (rear)
Xa55E Pin-jaw Tongs (front)

Xa56E Pin-jaw Tongs (rear)
Xa57E Pin-jaw-tongs Spring (complete)
60E and 61E Pin-jaw-tongs-spring Connecting-links
a5B and a6B Matrix Jaws
16B and 17B Pin Jaws
a8C and a9C Matrix Jaws
18C and 19C Pin Jaws

261. Put the Spring Box and Matrix-jaw Tongs in place.

262. To the Spring Box there are two adjustments:

First, length of stroke, which determines that both Bell Cranks have equal oscillation about the Jaw-tongs-bell-crank-fulcrum Stud.

Second, position of stroke.

263. OBJECT:—To cause the Matrix Jaws to close near 105 degrees and remain closed, under the load of the Spring Box for 90 degrees.

Note:—Machine conditions, as to wear of Cams may alter this closing time. It may be as early as 100 degrees or as late as 107 degrees, but it is most important that the Spring Box compression remains on for about 90 degrees. This insures that there be time to stop the Matrix Case before the Matrix Jaws open, and that the Case will be absolutely at rest when the Matrix Jaws move away from the Draw Rods.

264. Each Spring Box is independent, and each operates its own Bell Crank, both Cranks oscillating about the same center, the Bell-crank Stud. The lower Bell Crank operates the rear or C Jaws and the upper Bell Crank the front or B Jaws.

265. The stroke of each Crank may be regulated to suit its own Jaws, while the amount of oscillation which must be the same for both Cranks is changed by raising or lowering the Spring Box, by moving the Cam-lever Ball Extension. After this oscillation or length of stroke has been adjusted, the Ball Extension should be set up tight and tests made to see that the adjustment holds, and with reasonable care it may not be necessary to change this adjustment again for months. The adjustment of both Spring Boxes are similar, so we will consider the lower one only.

266. The position of the stroke of the Lower Rod, which is solid and not adjustable is altered by altering the distance between the Ball Extension and the Spring Plate.

267. The distance between the Ball Extension and Spring-box Plate is altered as follows: The left bearing

for the Ball Extension, the Ball Socket, may be moved right or left in the Spring-box Cap, but is prevented from rotating by the Ball-socket Guide-pin. The Ball Plug, the right bearing for the Ball Stud, is screwed into the Socket, so that the Ball Stud just works freely without being pinched. Screwing up the Ball-plug Nut draws the Ball Socket tight against the Ball-socket Plug, which is screwed into the Cap, and at the same time locks the Ball-socket Ball-plug in the Ball Socket.

268. To change the position of the Ball Socket, and alter the stroke of the rear Crank, the Plug is moved by turning the Plug Button. A tongue in this Button fits in a slot of the Plug so that the Button acts as a screw driver. Screwing the Plug into the Cap moves the Spring Box to the right and makes the Matrix Jaws close later. In assembling the Spring Box insert the Ball Socket into the chamber in the Tube Cap, with the slot over the Guide Pin. Insert the Ball Extension and screw up the Ball Plug until it just pinches the head of the Ball, but can be moved freely and without shake. With the Ball-socket Button, screw in the Ball Socket until its right end is about 1/16 of an inch inside the right end of the Tube Cap. Remove the Button and put on the Ball-plug Washer, then replace the Button and put on the Ball-plug Nut and draw up to bearing.

269. Now turn the Machine to 60 degrees and put the Spring-box Bell-cranks over the Bell-crank Stud, and the Spring-box Ball Extension into the Jaw-tongs-cam Lever and set up the Jaw-tongs-cam-lever Clamp-bolts and put on the Jaw-tongs-bell-crank-fulcrum Nut and Washer. Put the C Matrix-jaw Tongs into place and close the Lock-slides and put on the Matrix-jaw-tongs Stud-nut and Washer.

270. With the upper Spring Rod loose in the Spring-rod Cross-head, pull forward on the rear end of the lower Spring-box Bell-crank to make sure that the Spring Abutment is up against the shoulder on the lower Rod and see that the Spring-rod Nut and Lock-nut is set up to bearing on the Brake Cone, insuring no lost motion of the Spring Box on the Spring Rod.

271. Then turn the Machine till the C Matrix Jaws just close and note the degree on the Degree Vernier. The Jaws should close at about 105 degrees. If they are closing later or earlier, the position of the Ball Socket must be shifted backwards or forwards, dependent upon whether it is earlier or later than 105 degrees.

272. If earlier, loosen up the Ball-socket Nut and move the Button to the rear one turn, by means of a pin wrench inserted in the hole in the Button and lock up the Ball-socket Nut. Then note the time of closing the C Matrix Jaws. When the closing is at proper time, 105 degrees, then put the front or B Matrix-jaw Tongs into place and close their Lock-slides and put on the Matrix-jaw-tongs-stud Washer and Nut.

273. Turn the Machine two or three revolutions to see that the adjustment of the C Matrix Jaws are holding and that they are remaining closed for a period of 90 degrees. If the Matrix Jaws are not holding closed for 90 degrees it will be necessary to reset the Ball Socket, moving the Machine to an earlier or later point of closing than 105 degrees, dependent upon whether the Matrix Jaws remain closed for a longer or shorter period than 90 degrees.

274. The Matrix Jaws should have at least 1/32″ clearance between stops when opened to full extent. It may be necessary to close the C Matrix Jaws a trifle early and have them remained closed 2 or 3 degrees longer than 90 degrees to make sure that Matrix Jaws have about 1/32″ clearance when opened full.

275. When the proper setting has been reached turn the Machine till the C or rear Matrix Jaws are just closed, then set up the Nut against Brake Cone on upper Spring-box Rod to insure no lost motion in Spring Box. Then screw in the upper Spring-rod-cross-head Rod until the front or B Jaws are closing at the same time. Then lock the Spring-rod Lock-nut. Turn the Machine two or three revolutions and test both Jaws to see that they are closing at the same time and remaining closed for about 90 degrees.

Pin Jaws

276. Replace the Pin-jaw Tongs and the Pin-jaw-tongs Spring (complete), together with the Pin-jaw-tongs-spring Connecting-links and all the Nuts and Washers. Loosen the Lock-nut on the Pin-jaw-tongs-connecting-eye Adjusting Stud a55E16 and a56E4, so that when the Pin Jaws are brought together they do not close tight.

277. The object of this adjustment is to insure that the Pin Jaws will open far enough to engage the (1) Pin in the B Pin Block and the (A) Pin in the C Pin Block, and that they will not open so far as to bind

against their Stops when fully opened and that they will close together. Put on a piece of keyboard paper perforated to the 1–A position, turn on air, and turn the Machine over one revolution to properly place the Stop Racks and then turn the Machine to 310 degrees, when the Pin Jaws should be closed.

278. With the Pin-jaw-tongs-connecting-eye Adjusting Stud, adjust the C Pin Jaws so that two pieces of keyboard paper just pull between the Pin Jaws when in the A position and lock up the Lock-nuts, being sure that the paper still pulls when the Nuts are set up tight.

279. Then adjust the B Pin Jaws so that one thickness of Keyboard paper just pulls when Caster is at 310 degrees and the right Pin Jaw is against the (1) Pin. Then tighten the two Lock-nuts and turn the Machine by hand to see that the Pin Jaws are closing together in the A–1 position.

280. Then release the Air-bar-clamping Lever from the Hook and see that the Pin Jaws are closing alike at the 15–O position and not binding on the end of the Stops. Drop a litttle oil in the oil holes in the Matrix Jaws and Pin Jaws.

Type Carrier

281. The Type Carrier is operated through
71E and 71E1 Type-carrier Cam
72E Type-carrier-cam Lever
72E4 Type-carrier-cam-lever Extension
22B Type-carrier Extension
21B5 Type-carrier connecting-rod Forked-eye
21B Type-carrier Connecting-rod
22B4 Type-carrier-extension Spring
21B9 Type-carrier-connecting-rod Spring
21B6 Type-carrier-connecting-rod-forked-eye Lock-nut
21B2 Type-carrier-connecting-rod-forked-eye Lock-nut (left hand)
21B10 Type-carrier-connecting-rod-spring Abutment
21B11 Type-carrier-connecting-rod Sleeve
d20BB Type Carrier
b23BB Type-carrier Shoe (long)
b24B Type-carrier Shoe (short)
d26B Type Clamp
d31B Type-support Spring

282. There are two adjustments to the Type Carrier. First, length of stroke. Second, position of stroke.

283. See that the Type-carrier-connecting-rod-forked-eye Pin is in the right hand hole in the Type-carrier-cam-lever Extension and Type-carrier-connecting-rod Forked-eye.

284. OBJECT:—That the Carrier has enough stroke to permit of receiving the type properly and be so positioned that the type is properly delivered into the Type Channel when ejected by the Type Pusher.

285. First, the length of stroke is increased by raising the Type-carrier-cam-lever-eye Extension and decreased by lowering it. Turn the Machine to 280 degrees with the Type Pusher in the forward position in the Type Channel, and with a scale held on the right edge of the Normal-wedge-locking-pin Stand, with a pencil mark the Carrier. Then turn the Machine to 65 degrees and with the scale at the same place on the Locking-pin Stand, again mark the Carrier. The distance between these marks should be 2–5/32″.

286. Second, the position of stroke is altered by changing the length of the Type-carrier Connecting-rod.

287. To turn the Rod move the Carrier to the right hand position until the Rod moves through the Type-carrier-connecting-rod Sleeve enough to uncover the pin hole in the Rod. Slack off the Lock-nut and turn the Rod toward the back of the Machine to shorten it and move the Carrier to the left. In this position for casting, and when type is ejected into Channel Blocks, the right inside opening in Carrier should line with the face of the fixed Channel Block. Move the Carrier to the right hand position, 65 degrees, and make the distance from the right face of the B Pin Block to the face of the Carrier against which the Type Clamp rests (when holding no type), on the right side of the opening in the Type Carrier, 1–31/64″.

288. Caution:—Be sure that the Type-carrier Connecting-rod and the Type-carrier-extension Springs are in good condition and not broken, as the positive action of the Carrier and proper positioning of the Cross Block depends upon these Springs being in good working condition. If these Springs are broken the casting of the Type will be affected and injury may be done the Matrices because of the irregular positioning of the Cross Block.

Type Pusher

289. The Type Pusher is operated through a75E and a75E1 Type-pusher Cams

76E Type-pusher-cam Lever
77E Type-pusher Connecting-rod
77E1 Type-pusher-connecting-rod Ball Socket (long)
77E2 Type-pusher-connecting-rod Ball Socket (short)
77E3 Type-pusher-connecting-rod-ball-socket Nut
77E4 Type-pusher-connecting-rod-ball-socketLock-nut
77E5 Type-pusher-connecting-rod Lock-nut (for Bell-crank-ball-socket Plug)
77E6 Type-pusher-connecting-rod Spring
73E Type-pusher Bell-crank
74E Type-pusher-bell-crank-fulcrum Stud
29B6 Type-pusher-eye Pin
b29B Type Pusher
a28B Type-pusher Guide

290. There is but one adjustment of the Type Pusher; position of stroke.

291. The object of this adjustment is to have the Type Pusher deliver the type past the catches on the Latches of the Type Channel, but not far enough to permit the type to drop back causing it to be assembled off its feet. Draw the Line Hooks to the front to their stop. Remove the Type-channel Block (adjustable) 51FF.

292. Turn the Machine to 280 degrees. With the left hand draw to the left on the Type-pusher Cam-lever, to have the Type Pusher under its normal condition of resistance when assembling type. With the right hand adjust the Type-pusher Connecting-rod, with the Type-pusher-connecting-rod Nut, until the end of the Type Pusher stands 1/64″ in front of the catch on the Latch, on the fixed Channel Block a 50FF when the Cam Lever is held to the left to take up any lost motion. Then lock the Lock-nut. This insures that the type will be properly delivered into the Type Channel by the Type Pusher. Replace the Type-channel Block and restore Line Hooks.

Transfer Wedge Spring Box

293. The Type-transfer-wedge Spring-box is for the purpose of equalizing the spring compression on the Space-transfer Wedge and the Type-transfer Wedge, when they, through the Operating Rods, are brought against the Micrometer Wedge and to release these Wedges from the Normal Wedge, when the Transfer

Tongs strike their Stop. The adjustments of the Spring Box also take up the lost motion due to wear.

294. Transfer-wedge Spring-box is operated through
a69E and a69E1 Transfer-wedge Cams
70E Transfer-wedge-cam Lever
59D Transfer Tongs
53D Transfer-wedge Operating-rod
63D Type-transfer-wedge Operating-rod
60D Transfer-wedge Spring-box
55D Transfer-wedge Shifter
57D Transfer-wedge-lever Arm
57D4 Transfer-wedge-shifter-lever-arm Rod
57D1 Transfer-wedge-shifter-lever-arm Adjusting-nut
4D Bell Crank
2D Air Pins
20D Micrometer Wedge
52D Space-transfer Wedge
62D Type-transfer Wedge

295. OBJECT: That the Type-transfer Wedge or Space-transfer Wedge may be brought against the Micrometer Wedge and held firmly in position, for casting either type or spaces. Further, that these Wedges are moved out of position while the Normal Wedge and the Justification Wedges are being shifted.

296. Adjust the Transfer-wedge-spring-box-adjusting-rod Adjusting-nut so that the Spring Abutments (which form the Abutments inside of the Box for the Springs), are just pinched between the Nut and the Rod Head; that is, that the Rod has no shake in the Box.

297. Furthermore, this Nut must not be so tight that both the Spring Abutments do not touch the end of the Box, for the Springs must not have motion in the Box. Thus, when the Rod moves in either direction, the Springs will be compressed. Then firmly set up the Adjusting-nut Lock-nut and see that the Adjustment still holds.

298. Turn the Rod by the Adjusting-nut and its Lock-nut and screw it into or out of the Transfer-tong-space-wedge-lever Eye until, when the Type-transfer Rod is at the left end of its stroke with the Type-transfer Wedge against the Micrometer Wedge, the compression on the Spring Box is the same as when the Type-transfer-wedge Rod is at the right end of its stroke with the Raw-hide Washer against the Operating-rod Guide. Raise or lower the Transfer-tong-cam-lever Extension until there is 1/16″ compression at each end

of the Spring-box Rod. Examine compression when the Type-transfer-wedge Operating-rod is locked and the Space Rod moves.

299. Proceed by pushing the Space-transfer-wedge Operating-rod forward to engage the Centering-pin Lever on its up stroke, raising the Transfer-wedge-shifter Lever which causes the Transfer-wedge Shifter to lock the Type-transfer-wedge Operating-rod out.

300. The Transfer Tongs then move the Space-wedge Rod, setting the Space Wedge into position. If the compression is not the same, 1/16″ at both ends of the stroke of this Rod, the Spring-box Rod must be adjusted to equalize, as near as possible, the action of the Rods. When the Wedges are against the Micrometer Wedge, the compression may be greater than 1/16″ but never less.

301. Note:—The Space-transfer Wedge should be set practically correct, because the altering of the Space-transfer-wedge Adjusting-screw, if moved a great amount, will affect the setting of the Spring Box.

Transfer Wedge Shifter Lever Arm Rod

302. This adjustment is for length only. Object:—To lift the Transfer-wedge-shifter Lever high enough to cause the Transfer Shifter to engage the notch in the lower Type-transfer-wedge Operating-rod, and lock the Rod.

303. With the Machine at 12 degrees, adjust the Transfer-wedge-shifter-lever-arm Adjusting-nut until it stands 1/64″ above the top surface of the lower step on the Centering-pin Lever. Set up the Lock-nut.

Justification Wedge Lever Arm Rod

304. The Justification-wedge-lever-arm Rods are adjusted for length of stroke only.

305. OBJECT:—That the Justification Wedges be lifted high enough to be engaged and moved by the B Matrix Jaws.

Move the Justification Wedges as far to the right as possible; that is, until the last notch at the left end of the Justification Wedges is seated on the Justification-wedge-centering Tooth. Move the right Justification-wedge-lever-arm Rod forward, to engage the Centering-pin Lever, at the same time release the Pump Hand-trip so that the load of the Pump Spring may come on the Justification-wedge Levers, and turn the Machine

to 12 degrees when the right Justification-wedge-lever-arm Rod should just clear the guard on the plate on the Centering-pin Lever. With the Machine at 12 degrees adjust the left Transfer-wedge-operating-rod Nut until it just clears the guard on the plate on the Centering-pin Lever.

306. Note:—With the Machine at 12 degrees, see that the Wedges can be raised slightly higher, to insure that they are not binding on the C Pin Block or B Locking Bar through and under which they pass.

Bell Crank

307. There are two adjustments to the Justification-lever-arm Bell-crank and the Transfer-wedge-lever-arm Bell-crank.

First: The distance they are pulled back by their Spring.

Second: To give clearance between the Air Pins and the Bell-crank-abutment Screw, for Air Pins.

308. OBJECT:—That the fall of the Bell Cranks may be checked in time to prevent the Shifter-lever-arm Rod and the Justification-wedge-lever-arm Rod from striking the Centering-pin-lever Plate.

309. The Rods should just touch the Plate as the Lever is descending, for this helps to check them and prevent their vibration. If the Rods strike the Plate with any force they will bounce back and engage the Centering-pin Lever on the next up-stroke.

310. Disengage both the Space-transfer-wedge-lever-arm Rod and the Justification-wedge-lever-arm Rods and turn the Machine slowly to 180 degrees and adjust the Bell-crank-adjusting-screw Stop-screw on the left Bell Crank till the Rod just touches the Centering-pin-lever Plate. Lock the Lock-nut. Then turn to 180 degrees and adjust the Stop Screw on the right Bell Crank till the Rod just touches the Centering-pin-lever Plate. Lock the Lock-nut. Turn the Machine to 190 degrees and adjust the center Bell-crank Adjusting-screw till it just touches the Centering-pin-lever Plate. Lock the Lock-nut.

311. Second. OBJECT:—That the Air Pins start to move before the load of the Bell Cranks come on them.

312. After the previous adjustment has been made, be sure that the Bell Cranks are resting on their Stop Screws. Screw down on the Bell-crank Adjusting-screws for Air Pins, until they just touch the Air Pins

when the latter are at the bottom of their stroke. Then unscrew each Screw one-half turn and lock it.

Normal Wedge Locking Pin

313. The Normal-wedge-locking Pin is connected to the Centering-pin Lever and descends in unison with the Centering Pin.

314. Put the Normal Wedge in place in the Machine.

315. Time of stroke is the only adjustment for the Normal-wedge-locking Pin.

316. OBJECT:—That the Normal-wedge-locking Pin may descend and seat in the Normal Wedge, locking it accurately in position, just after either Transfer Wedge has made its stroke to the left and come in contact with the Micrometer Wedge. Furthermore, that the Locking Pin may seat before the Mold-blade-abutment Slide has moved back and clamped the Wedges, and that the Locking Pin may lift high enough to clear the teeth of the Normal Wedge before it moves to the next position.

317. Engage the Transfer-wedge-lever-arm Rod and the Justification-wedge-lever-arm Rod with the Centering-pin Lever and turn the Machine over, bringing the Justification Wedges and Normal Wedge to the left hand position. Turn the Machine over six or more times until the Galley is at rest.

318. With the Machine at 12 degrees move the Normal Wedge far enough to the right, that the Matrix-jaw Latch can be raised. Then move the Normal Wedge to the left, until the right edge of the Lug on the Normal Wedge is flush with the right edge of the Matrix-jaw Latch, in its raised position.

319. Back off on the Normal-wedge-locking-pin Lock-nut and Adjusting-nut, allowing the Normal-wedge-locking Pin to descend on top of the Normal Wedge.

320. Turn the Normal-wedge-locking-pin Adjusting-nut until it just touches the Normal-wedge-locking-pin-spring Abutment. Hold down on the Spring Abutment with a screw driver to compress the Spring, to take up the lost motion between the Centering-pin Lever and the Locking-pin Abutment, and while under pressure of the screw driver, advance the Adjusting-nut until it again touches the Abutment.

321. Remove the screw driver and turn the Adjusting-nut one full turn to the right and set up the Lock-

nut tight. Move the Normal Wedge forward and restore the Matrix-jaw Latch.

322. We are now assured that the Pin is in proper time with the movements of the wedges, that it clears the Normal Wedge and that it will not be lifted so high that it binds on the up stroke on the Normal-wedge-locking-pin-guide Screw.

The Galley

323. The Galley mechanism takes the completed line from the Type Channel, tests them for length and places them in the Galley.

324. The Galley may be divided into six parts, for convenience of adjustment:

Worm Wheel
Column Pusher
Rule
Line Hooks
Galley-trip Lever
Operating-rod Lever

325. These parts are operated from the Worm Wheel that takes its power from the Cam Shaft, through the Worm-shaft Gear and the Cam-shaft Gears, driving through the

15F3 Worm Wheel
15F Galley-cam Shaft
14F8 Galley-cam Sleeve
a14F Galley Cam
25F Line-hook-operating-slide Lever
27F Line-hook-operating-slide Spring-box
a23F Line-hook-operating Slide
19F Line Hook
5F Column-pusher Lever
14F1 Galley-cam-driving Pawl
15F2 Galley-cam-shaft Ratchet
8F Column-pusher Spring-box
1F Column Pusher
45F Trip Lever
32F Operating Lever
a50F Type-channel Block (adjustable)
a51F Type-channel Block (fixed)
44F Stop Slide
33F Operating-lever Latch
36F Operating-lever-latch Stand
8D Galley-trip Rod

Worm Wheel

326. The Worm Wheel is the seat of power from the Cam Shaft, from which is driven the Galley mechanism. It must be so adjusted that it engages the proper tooth in the Worm.

327. The object of this adjustment is, that when the Galley-cam-driving Pawl is released from the Trip-lever Latch, that the edge which engages the Galley-cam-shaft Ratchet will fall in the middle of the flat on the top of the Ratchet Tooth. This insures that the Line Hook will swing to the right late enough to engage the last type of the line, but not so late that it will not have time to pull it out of the way, before the first type of the next line is delivered.

328. Turn the Galley-cam Shaft so that the Galley-cam Pawl rests on the flat of the top of the Tooth of the Ratchet as described, and hold it in this position. Replace the Worm Shaft, so that the Worm-cam-shaft Gear matches with the Cam-shaft Gears. At the same time see that the Worm Wheel meshes properly with the Worm when the Ratchet is positioned as described; the relation between the three Gears is then correct.

329. NOTE:—A tooth on the Worm is marked with a zero and two teeth on the Worm Wheel are similarly marked on each side of the space in which this tooth should mesh. See that these Gears are always marked before taking down, in order to save time in reassembling. To test this, turn Machine over with pump in operation and engage the Justification-wedge-lever-arm Rod with the Centering-pin Lever and see that the Pawl drops in the middle of the flat on top of tooth of the Ratchet.

Column Pusher

330. There are three adjustments to the Column Pusher.

First, position in relation to fixed Channel Block.
Second, right end of stroke.
Third, left end of stroke.

331. First. OBJECT:—That the rear of the Column Pusher will just clear the end of the fixed Channel Block, in order that the thinnest type may not be caught between the Pusher and the Block.

332. Regulate the Column-pusher-fulcrum Screws to adjust the Pusher. Advance or retard these two until, when the Column Pusher is pushed to the right, there

is about .003 clearance between the rear end of the Column Pusher and the fixed Channel Block. Set up the Lock-nuts on the Fulcrum Screws and see that the Column Pusher moves freely and without interference.

333. Second. OBJECT:—That the Column Pusher may push the line past the right hand face of the rule 3/64″.

334. Adjust the length of the Column-pusher Spring-box by screwing it in or out on the Spring-box-adjusting Ball Plug, to make the stroke of the Pusher right, as described. When the Ball Plug is fully adjusted lock it with its Lock-nuts.

335. Third. OBJECT:—That the right hand face of the Pusher may be, for any size type, slightly to the left of the face of the Adjustable-type-channel Block, when a type of the point size to be cast is in the Type Channel.

336. Place a 12 point type in the Type Channel and see that the Column-pusher-adjusting-screw Spring is in the No. 12 notch of the Column-pusher Adjusting-screw. Alter the position of the Column-pusher-adjusting-screw Stand by moving it along its Stud and lock it with the Nut so that the face of the Column Pusher stands behind the Channel Block as described. When the Stand is so adjusted, the Pusher is regulated for any point size by turning the Adjusting Screw until the Spring falls in the notch corresponding to the point size desired. See that the Column Pusher is working freely and restores when forced to the right hand position, under tension of the Column-pusher Spring.

Rule

337. Adjust to clear the Column Pusher.

OBJECT:—That as the Rule descends when the Column Pusher is passing under it, pushing the line on the Galley, the Rule will stop 1/64″ above the Pusher, until it withdraws from beneath the Rule.

338. This insures that the type may be caught by the Rule, and prevented from falling to the left when the Column Pusher withdraws. Trip the Galley, turn Machine till the Column Pusher is in its forward position. Turn the Machine to 150 degrees and adjust the position of the Rule-lifting-rod Sleeve, by moving the Rule-lifting-rod Adjusting-nuts and Lock-nuts to give 1/64″ clearance when the Pusher, under the Rule, is moving to the left.

Line Hook

339. There are two adjustments for the Line Hooks.
First, position of forward end of stroke.
Second, compression of the Spring Box.

340. First. OBJECT:—That the Line Hooks may place the rear end of the line in front of the Galley so that it will just clear the fixed Channel Block when the Column Pusher moves the line on to the Galley. Adjust the Line-hook-operating-bar-stop Adjusting-screw so that, when it is locked by the Stop Screw, the Operating Bar on the forward stroke will be stopped at the proper point for the Line Hooks to place the last type in the line to just clear the fixed Channel Block, when moved to the right by the Column Pusher.

341. Second. Adjust the Line-hook-operating-slide-spring-box Adjusting-nut so that there is no lost motion in the Line-hook-operating-slide Spring-box; that is, that the Line-hook-operating-slide-spring-box Rod cannot move in either direction without compressing the Line-hook-operating-slide-spring-box Spring.

342. OBJECT:—That the Line Hooks may deliver the line in position for delivery on the Galley without shock, but will arrive at point of delivery and dwell about 5 degrees before coming under compression of the Line-hook-operating-slide-spring-box Spring.

343. With the Machine at 40 degrees trip the Galley and turn the Machine two revolutions and to 314 degrees and adjust the Line-hook-operating-slide-spring-box Rod and its Eye, by means of the Nut and Lock-nut, until the Line-hook-operating-slide-spring-box-rod Adjusting-nut just touches the Line-hook-operating-slide-spring-box-spring Abutment and there is no compression on the Spring Box. Turn the Machine and lock the Line-hook-operating-slide-spring-box-rod-eye Lock-nut.

Galley Trip Lever

344. The Galley Trip Lever has two adjustments.
First, position of rest.
Second, length of stroke.

345. First. OBJECT:—That the Galley-trip Lever will hold the Galley-driving Pawl without binding, so that the Pawl may be released properly.

346. Adjust the Trip-lever Stop-screw so that the rear end of the Pawl will clear the arm of the Galley-cam-trip Lever by 1/16″ when the left end of the Lever

is as far forward as the Stop-screw will permit. Lock the Lock-nut.

347. Second. OBJECT:—That the Trip Lever will be moved far enough to clear the Pawl when the Galley is tripped.

Single Justification:

348. Adjust the Galley-trip-lever Adjusting-screw so that when the left end of the Lever is moved as far back as possible by the Galley-trip Lever, when both Justification-wedge-lever-arm Rods are engaged with the Centering-pin Lever, the Lever will clear the Pawl by 1/16″. Lock the Clamp Screw. Swing the Swing Abutment to the rear. When this adjustment is correctly made it is seldom necessary to change it.

Double Justification:

349. For Double Justification turn the Swing Abutment on the end of the Trip Lever to the front of the Machine. This Abutment is so constructed that it will enable the Trip Lever to clear the Pawl when both Justification-lever-arm Rods drop forward to engage the Centering-pin Lever.

350. Note:—On Machines not equipped with this swing Abutment it will be necessary to use the above Single Justification adjustment for Double Justification. For Single Justification make the setting of the Lever to clear the Pawl by 1/16 of an inch, when either one of the Justification-wedge-lever-arm Rods are engaged with the Centering-pin Lever, and at the top of its stroke.

Operating Lever

351. The Operating Lever has one adjustment, namely, the position of stroke of the Belt Shifter.

OBJECT:—That when the Operating Lever is pushed to the left and engaged by the Operating-lever Latch, the Belt will be moved to the Driving Pulley.

352. Push the Operating Lever as far to the right as possible; that is, until the right hand arm of the Lever strikes against the Galley-cam Shelf. Then move the Operating-lever Spring-box forward until the Plunger just touches the left arm of the Operating Lever. Move the Belt-shifter Rod forward until the Fibre Washer is against the Cam-shaft Stand.

353. Loosen the Belt-shifter-arm Screw. Move the Belt-shifter Arm until it stands 1/32″ behind the Operating-lever Spring-box.

Tighten the Clamp Screw.

354. Adjust the Belt-shifter Eye, in relation to the Belt-shifter Arm, so that when the Operating Lever is moved to the left and engaged by the Operating-lever Latch, the Belt will have moved to the Driving Pulley.

Replace the Mold.

Mold Blade Operating Rod

355. Adjust for time of movement.

356. OBJECT:—First, that the Mold Blade will not move back to casting position and clamp the Justifying Wedges, when set for the smallest space, until either one of the Transfer Wedges has finished its stroke to the left and the Normal Wedge is locked in position.

357. Second, to eject the type into the Carrier before the Type Carrier starts to move from its right position.

358. Third, that the Mold Blade will be positioned for the largest size type before the Matrix seats on the Mold, to avoid wear of the Matrices.

359. First, adjust Mold-blade Connecting-rod so that the Abutment moves 1/32″ away from the distance sleeve on the Mold-blade Operating-rod on its forward stroke. This can be tested by noting shake in the Mold-blade Operating-rod.

360. Second, turn the Machine until the Type Carrier is as far to the right as it will go and note that the Ejecting-spring Abutment has moved not less than 1/32 of an inch from the Distance Sleeve.

361. Third, put the largest set Wedge in the plant in place, turn the Machine until an 18 unit Matrix, with a cone hole, just seats on the Mold. In this position, compression should have started on the Sizing Spring, insuring that the Mold Blade is moved back and at rest.

The Bridge

362. The Bridge is one of the most important parts of the Casting Machine and upon its proper adjustment depends the life of the Matrices, the truth of the alignment for all Matrices run on the Machine of which it is a part, and the life of the Mold.

It is operated from

13E and 13E1 Centering-pin Cams
a14E Centering-pin-cam Lever
a16E Centering-pin Lever
2A1 Bridge-lever-connecting Link

3A Bridge-lever-link Pin
a2A Bridge Lever
2A2 Bridge-lever-fulcrum Rod
2A3 Bridge-lever-fulcrum-rod Eye
2A5 Bridge-lever-fulcrum-rod-eye Pin
a4A6 Carrying-frame-guide-rod Cross-beam
a4A8 Carrying-frame-guide-rod-cross-beam Stud
4A9 and 4A10 Carrying-frame-guide-rod-cross-beam-stud Adjusting-nuts
4A7 Carrying-frame-guide-rod-cross-beam Nut
4A1 Carrying-frame Guide-rod
4A2 Carrying-frame-guide-rod Stop-nut
4A12 Carrying-frame Raising Spring
1A7 Carrying-frame-bushing Nut
1A6 Carrying-frame-guide-rod Bushing
4A Carrying Frame
a9A Sliding Frame
a8A Matrix Case
6A3 Centering-pin-stand Bolt
a6A Centering-pin Stand
b6A5 Centering-pin-stand Bushing
a28A1 Centering-pin
18A1 Centering-pin Abutment (lower)
18A2 Centering-pin Spring
19A1 Centering-pin Abutment (Upper)
31A1 Centering-pin Lifting Link
30A1 Centering-pin Auxiliary Lever
30A3 Centering-pin-auxiliary-lever-fulcrum-link-eye Bolt
30A4 Centering-pin-auxiliary-lever-fulcrum-lever-eye-bolt Nuts
19A2 Centering-pin-spring-abutment Rod
31A5 Centering-pin-lifting-link Adjusting-screw (outer)
31A6 Centering-pin-lifting-link-adjusting-screw Lock-nut
21A1, 20A1, 20A2, a1A2 Centering-pin-spring-abutment Levers
22A1 Centering-pin-spring-abutment-lever Adjusting-screw
22A2 Centering-pin-spring-abutment-lever-adjusting-screw Knurled Wheel
10A1 Bridge Bracket
17A2, 17A1 Bridge-bracket-yoke Link
a23A1 Lifting-tube-operating Fork
25A1 Lifting-tube-operating-fork Stop
14A1 Bridge-bracket-spring-box Lifting Tube
12A5 Bridge-bracket-spring-box Rod

12A1 Bridge-bracket Spring-box
13A1 Bridge-bracket-spring-box Bell-crank
a87E1 Mold-blade-latch Bell-crank
7A Fibre Stop
14A2 Bridge-bracket-spring-box-lifting-tube Handle
9A1 Sliding-frame Draw-rod

363. Remove the Mold.

Carrying Frame

364. The Carrying Frame is now adjusted to the Carrying-frame-adjusting Gage that is furnished to each plant.

The use of this Gage insures that each Bridge will be adjusted alike in the plant, since each are adjusted with the same Gage, which insures more safety to the Matrices.

365. The object of the adjustment of the Carrying Frame is to insure that when the Centering-pin is at the bottom of its stroke, the Centering-pin holding the Matrix tight on the Mold, the Carrying Frame will be stopped by the Guide-rod Stop-nuts so that the Matrix-case Combs will be central in the slots in the Matrices.

366. See that the feet of the Bridge are clean, the bearings on the Main Stand clean, and that the Bridge is screwed down firm into position, and coupled to the Centering-pin Lever. Loosen the Cross-beam Stud-nut and Lock-nut.

367. Put a keyboard ribbon on the Paper Tower, perforated for the 8–H position, the center of the case, and turn the Machine over to position the Stop Rack. Raise the Locking-bar-operating-rod Eye off the Locking-bar-cam-lever Stud.

368. With the Centering-pin Lever at the top of its stroke, the Machine at 360 degrees, insert the Gage in the Sliding Frame, the same as the Matrix Case is inserted, with the two feet toward the rear of the Machine. Move the Gage back as far as it will go and see that it can swing to the left to the B Pin Block.

369. Put three thicknesses of Keyboard Paper under each foot of the Gage and turn the Machine to 220 degrees or casting position. Slack off on both Carrying-frame-guide-rod-stop-nut Lock-nut and the Guide-rod Stop-nut. This is to insure that both feet of the Gage are bearing on the paper.

370. Screw down on both Stop-nuts until they touch the Carrying-frame Lifting Springs, then by turning

the Lifting Springs, screw the Stop-nuts still further down until the Tension on the thread is greater than the Tension of the Nut against the Spring. This will leave the Stop-nuts at practically the same height above the Bridge.

371. Now screw down each Nut, in turn, an equal amount, until the paper just pulls between the feet of the Gage and the top of the Main Stand.

372. Tighten the Lock-nut and see that one thickness of Keyboard Paper just pulls under the feet of the Gage after the tightening has taken up the lost motion in the thread. If this Paper does not pull, the Stop-nuts must be loosened equally and the Lock-nuts set up again.

Note:—One sixth of a revolution of these Nuts is just short of .013 of an inch.

373. If the above adjustment is correctly made it should hold for all Molds and Matrices, but should be inspected every week to make sure that none of these adjustments have given way and injury being done to the Matrices. Release the Locking Bars and remove the Gage.

374. The time the Matrix seats on the Mold, which should be between 208 and 212 degrees, is determined by the adjustment of the Bridge-lever-fulcrum Rod. The center of the Bridge-lever-fulcrum-rod-fork Eye should be 4–15/16″ above the top of the Bridge. This adjustment is made by altering the position of the Bridge-lever-fulcrum-rod Nut. Then lock the Lock-nut tight.

375. Turn the Machine until the Bridge Lever is at the top of its stroke, adjust the Carrying-frame-guide-rod-cross-beam-stud Adjusting-nut until the Fibre Stop can be moved freely between the Guide Rod and the Guide-rod Bushing. Then lock the Lock-nut. This determines the proper compression for the Cross-beam-stud Spring, about 1/64″.

376. Replace the Mold on the Machine, see that it is properly connected, and put in the Normal Wedge.

377. Now put the Matrix Case in the Machine and clamp a piece of Keyboard Paper on the Cross Girt, perforated for the 8–H position. This positions the Matrix Case so that the center Matrix in the Case (the lower case y in the C arrangement) comes under the Centering-pin.

Turn the Machine one revolution to position the Stop Racks and then release the Locking-bar-operating-rod Eye from the Locking-bar-cam-lever Stud. This

holds the Stop Racks in a fixed position and always brings the same Matrix to bear on the Mold, for the adjustment of the Draw Rods.

Draw Rods

378. The Draw Rods are adjusted for length only.

OBJECT:—That the Matrix Jaws may move the Matrix Case as nearly as possible to the casting position, corresponding to the different Air-pins, thus reducing to the minimum the work of the Centering-pin in positioning the Matrices on the Mold.

379. With the Machine set as above stated, turn the Machine to 220 degrees, with the Centering-pin at the bottom of its stroke, firmly locking the Matrix on the Mold and with the Matrix Jaws opened about ½″. With the left hand draw to the left on the left Matrix Jaw as far as possible. This will bring the right Matrix Jaw up to the head of the Stop Rack. Now test to see that there is a slight clearance between the front edge of the head of the Sliding-frame Draw-rod and the right Matrix Jaw. Then push to the right on the left Matrix Jaw until it comes up to the rear of the head on the Stop Rack.

Note:—That the clearance of the Draw Rod is the same as when the right Matrix Jaw is against the Stop Racks.

380. If the clearance is not the same then the Draw Rod must be altered. This is accomplished by releasing the Sliding-frame-draw-rod-clamp Screw and moving the Draw Rod, with the Pin Wrench inserted in the holes in the head of the Draw Rod. When the clearance is equal lock the Clamp Screws.

381. The C or rear Draw Rod is adjusted in the same manner, using the C Matrix Jaws, front and rear, in the same manner and shifting the Draw Rod, after loosening the Cross-slide-draw-rod-clamp Screw, tightening it again after the settings are equal.

382. Note:—Be sure that the head of the Stop Rack is not worn so that it is of less length than the distance from the front side of the head of the Draw Rod to the rear end. If it is so worn the Stop Rack should be repaired at the factory. Release the Locking Bar.

Low Quad Adjustment

383. The Low Quad Adjustment is designed, when working with any low quad Mold, to automatically cast high and low spaces, at will of the operator. It

must be so adjusted that there is no interference in working parts and that each part performs the work it is intended to do.

384. The object of these adjustments are that the Centering-pin will seat the Matrix properly on the Mold, under the proper Spring compression, and that the mechanism will automatically change the Blades in the Mold through the Latch and Bell Cranks when a Matrix without cone hole is presented for a cast so that low quads or spaces will be produced.

385. There are five adjustments to the low quad attachment to be considered. For all these adjustments the Matrix Case is to be in the Machine with the Centering-pin in the cone hole in the 18 unit row, the Lifting-tube Handle to be turned toward the front of the Machine and the Latches thrown over toward the front into position for regular composition.

386. First, turn the Machine until a piece of Keyboard Paper just pulls between the Matrix and the Mold. Adjust the Centering-pin-lifting-lever-lifting-link Adjusting-screw to give six points (.083) clearance between the bottom of the slot in the Centering-pin Lifting Links and the underside of the lug on the lower Centering-pin-spring Abutment. Lock the Centering-pin-lifting-link-adjusting-screw Lock-nut.

387. Second, turn the Machine to 190 degrees. If the Lifting-tube-operating Fork is caught under the Tee Head of the Bridge-bracket-spring-box Lifting Tube, push it out. Adjust the Centering-pin-spring-abutment-lever-adjusting-screw Knurled Wheel, till the rear edge of the Lifting-tube-operating Fork just clears the front face of the Tee Head on the Bridge-bracket-spring-box Lifting Tube. Lock the Centering-pin-spring-abutment-lever-adjusting-screw Lock-nuts. Then test with a steel blank and note there is no forward movement of the Lifting-tube-operating Fork.

388. Third, set the Machine to a Matrix without a cone hole in the 18 unit row. With the Centering-pin Lever at the top of its stroke mark the front of the Centering-pin Lifting-link three inches above the top of the Bridge. Then mark the Scale 27/32″ below the three inch mark on the Scale. Turn the Machine to 220 degrees and adjust the Centering-pin-auxiliary-lever-fulcrum-link-eye-bolt Nut until the mark on the Link comes to the mark on the Scale, then lock the Lock-nuts tight, being sure that the Centering-pin-auxiliary-lever-fulcrum Link stands straight with the

Bridge Lever and does not rub the Centering-pin Lever. Test by turning the Machine two or three revolutions.

389. Fourth, turn the Machine to casting position, 220 degrees. Adjust the Bridge-bracket-stop Screw to give ten points (.138) clearance between the lugs on the Lifting-tube-operating-rod Fork and the underside of the Tee Head on the Bridge-bracket-spring-box Lifting Tube. Lock the Bridge-bracket-stop-screw Lock-nuts.

390. Fifth, with a 12 set or the largest set Wedge in the plant get the quad size correct. Turn the Machine to casting position. Loosen up on the Bridge-bracket-spring-box-rod Adjusting-nut and Lock-nut. With the left hand under the rear end of the Bridge-bracket-spring-box Bell-crank, raise the Bridge-bracket Spring-box slowly until the Bridge-bracket-spring-box Bell-crank meets resistance.

391. Adjust the Bridge-bracket-spring-box-rod Adjusting-nut so that it clears the end of the Bridge-bracket Lifting Tube by 1/64″ when the Bridge-bracket-spring-box Bell-crank meets resistance by coming against the Mold-blade-latch Bell-crank which rests on the Mold-blade Latch, because of the upper pressure exerted on the rear end of the Bridge-bracket-spring-box Bell-crank. Lock the Bridge-bracket-spring-rod-adjusting-nut Lock-nut.

392. Note:—By exerting more upward pressure on the rear end of the Bridge-bracket-spring-box Bell-crank the Mold-blade Latch is unlocked from the Mold-blade-operating-rod Fork. This can be told by a sharp "click" and the change in position of the Bridge-bracket-spring-box-rod Adjusting-nut. If there is no "click" it shows that the Mold-blade Latch has not been properly engaged when making the adjustment. Turn the Machine one revolution and try again.

393. Before proceeding further with the adjustments it will be necessary to have the metal in the Machine at casting temperature, 680 degrees to 750 degrees, according to the hardness and ductility of the metal used.

Pump

394. The Pump is operated through
66E and 66E1 Pump Cam
67E Pump-cam Lever
68E1 Pump-cam-lever-connecting-rod Eye
68E5 Pump-cam-lever-connecting-rod-eye Pin
68E Pump-cam-lever Connecting-rod

68E4 and 69E2 Pump-cam-lever-connecting-rod Lock-nuts
68E3 Pump-cam-lever-connecting-rod Eye
34H Pump-operating Lever
33H1 Pump-rocker-arm Latch
33E4 Pump-rocker-arm Plunger
49D1 Pump-trip-tube Collar
22H1 Pump-bell-crank-connecting-rod Eye
22H2 and 22H4 Pump-bell-crank-connecting-rod-eye Lock-nuts
22H Pump-bell-crank Connecting-rod
21H Pump Bell-crank
19H1 Piston-operating-rod-cross-head Lever
19H Piston Operating-rod
31H Pump-body-spring Rod
31H1 Pump-body Spring
31H11 Pump-body-spring-rod Sleeve
31H2 Pump-body-spring-rod Cross-head
31H8 Pump-body-spring-rod-cross-head Stop
19H3 Piston-operating-rod Cross-head
20H1 Piston-spring Rod
20H Piston Spring
26H Pump-body Lifting Lever
24H Pump-body Lever
29H3 Pump-body-operating-rod-lever Stand
18H Piston Lever
29H Pump-body-operating-rod Lever
32H Pump-lever Connecting-link
25H Pump-body Lifting Lever (Piston End)
23H Pump Body
28H Pump-body Operating-rod
17H Piston
14H Nozzle

395. For convenience in adjusting, the Pump Mechanism is separated into seven sections:

Pump-cam-lever Connecting-rod
Pump-bell-crank Connecting-rod
Piston
Piston Spring
Pump Operating-rod
Nozzle
Pump-trip Collar

Pump Cam Lever Connecting Rod

396. Adjust only for length.

OBJECT:—That the Pump-rocker-arm Latch may be able after it has released the Pump Operating lever,

to re-engage it as soon as the Pump-trip-tube Collar is moved from contact with the Latch.

397. Note:—The Pump-cam-lever Connecting-rod is provided with right and left hand threads. This arrangement doubles the speed of separation of parts or drawing them together. The Pump Rod is shortened by screwing into the Eyes and lengthened by screwing out of the Eyes.

398. Alter the length of the Pump-cam-lever Connecting-rod by screwing the Rod into or out of the Eyes until, when the Rocker Arm is pushed as far as possible to the right by the Operating Lever, the Rocker-arm Plunger will strike the Main Stand and compress the Plunger about 1/64″. Lock the Lock-nuts. This Rod should measure 3–27/32″ between the faces of the two Lock-nuts where they lock against the Eyes. This insures that the Operating Lever will engage the Latch after the Pump-trip Collar is moved from contact with the Latch.

Pump Bell Crank Connecting Rod

399. This adjustment is for length only. The Pump-bell-crank Connecting-rod is provided with right and left hand threads.

OBJECT:—That the Pump Bell-crank may clear the Swing-frame Post and Main Stand, equally at either end of the stroke.

400. Set the Nuts at equal distance from the ends of the Rod and make the outside faces of the Nuts 7–1/8″ apart on the Rod and screw the Rod into the Eyes till the end of the Eyes are separated 7–1/8″. Lock the Lock-nuts. This setting of the Rod gives the proper vibration to the Bell Crank.

Piston

401. There are two adjustments to the Piston for position.

First, position of Pump-body-spring-rod-cross-head Stop.

Second, position of Pump-body-spring-rod Nut.

402. These adjustments affect each other and are made together.

OBJECT:—That the Piston may be clamped tight against the Pump-body-piston Stop at all times, except when the Nozzle is in contact with the Mold.

403. Raise the Melting Pot into position. Slack off on the Pump-body-spring-rod Nuts, the Pump-body-

spring-rod-cross-head Stop, and the Pump-body-operating-rod Nut and Lock-nut. Turn the Machine to 218 degrees with Pump in action.

404. Screw the Pump-body-cross-head Stop up against the Piston Cross-head until it just touches it. Then move it ½ turn further until the Connecting Link will stand in the center of the hole in the Piston Lever. This is noted by being able to revolve the Pin freely. Lock the Pump-body-spring-rod-cross-head Stop-nut. This will give about 1/64″ compression on the Pump-lever-connecting-link-plunger Spring.

405. Then screw the Pump-body-spring-rod Stop-nut up till it touches the Swing-frame Post and draw it as tight as possible with the fingers. Then lock the Lock-nut against it.

Pump Body Operating Rod

406. Adjustment of position of Pump-body-operating-rod Lever.

OBJECT:—That the Nozzle will seat in Mold before Piston starts to move and will not leave the Mold until the Piston is at rest at the top of its stroke.

407. Alter the position of the top Operating-rod Adjusting-nut so that there will be about 1/64″ clearance between the Operating-rod Lever and the Piston Lever, when the Operating-rod Lever is pushed as far to the front as possible, with the Pump Trip released and the Machine at 218 degrees.

408. Note:—When operating with the 1E Mold and 2E Mold there should be two notches in the Piston Lever and the clearance made of the Operating Lever in the left notch for the 1E Mold and the right notch for the 2E Mold. The setting made correct for either will not need to be changed, but the Lever must be in the correct notch for the Mold used.

Pump Trip Collar

409. Adjust for position.

OBJECT:—That the Pump-trip Collar may be moved forward the proper amount to engage the Pump-rocker-arm Latch, either by the lift of the Justification-wedge Levers, when the Justification Wedges are being set, or by the Pump Trip, when the Pump is locked up by hand.

410. Unlatch the Pump Trip and push it back as far as possible to insure that the Pump-trip Spring has moved the Pump-trip Tube all the way back.

411. Turn the Machine until the Pump-rocker-arm Latch is as far to the right as it will go, 150 degrees. In this position the Collar should be 1/32″ back of the Latch.

412. The Collar can be easily seen from the hole in the right of the Main Stand. Adjust the Pump-trip-tube Collar in this position and lock the Set Screw, being sure that the Collar does not slip on the Tube when it is being set up tight. The Collar should clear the Latch by about 1/32″.

Nozzle

413. There are two adjustments to the Nozzle.

First, to insure that the Axis is vertical.

Second, center with Cone Hole in the Mold.

414. First. OBJECT:—That the axis of the Nozzle may coincide with the Nozzle Seat in the Mold, in order to insure a tight joint between the Mold and the Nozzle. In short, that in casting position the body of the Nozzle is square with the base of the Mold.

415. Remove the Bridge, Mold, Nozzle and Type Carrier. Raise the Pot into position. Turn the Machine to 220 degrees with the Pump Trip released. Screw the Nozzle-squaring Pin into position, being sure it is properly seated and run down till shoulder seats on Pump Body.

416. The Pin must stand perpendicular to the Mold seat on the Main Stand. Test this with a square. When squaring up Nozzle the Pump Body should stand in same position as when Nozzle is seated in Mold.

417. The construction of the Pump Bodies are such that this Pin will be square front and back, unless the Machine has a badly worn Pump Body and Pump-body Lifting Lever, in which case they should be renewed.

418. Adjust by square right and left by altering position of the Pump-body-operating-rod Nut. Test for square after these Nuts are set up tight with their Lock-nuts. Remove the Squaring Pin.

419. Second. OBJECT:—That the Nozzle may enter the Nozzle Seat in the Mold without dragging on either side of the Cone.

420. Replace the Mold and remove the Cross-block Bring the Machine slowly to casting position, 220 degrees, and note the travel of the Nozzle into its Cone Seat in the Mold. If it is not central then it will be necessary to move the Melting Pot Casing.

Loosen the two Set Screws, the right and left Adjusting Screws 37H10 and the front Adjusting Screw 37H9. Raise the Pot into position and bring the Machine to 220 degrees, with the Pump Trip released, then with the large screw driver shift the Casing until the Nozzle is central in the Cone Hole. Tighten to bearing the front Stud Nut. Lower the Pot and bring the three Adjusting Screws to bearing on the lug on the Metal-pot Casing.

421. Bring the Pot again into position and test the Nozzle for center. If it is not now true it can be brought into position with the Adjusting Screws after loosening the Stud Nut.

422. Remember, as one Screw is advanced the opposite one should be withdrawn. When the Nozzle is central lock all the Adjusting Screws tight against the lug and the two Stud Nuts against the Swing Frame.

Piston Spring

423. Adjust for compression.

OBJECT:—That the Piston may exert sufficient pressure in forcing the metal into the Mold to insure that the type be cast with perfect feet.

424. Screw the Piston-spring-rod Nut down on the Piston-spring Rod to increase the pressure of the Piston Spring as the Piston wears. Do not test this setting till after other adjustments are completed. This additional Spring pressure, for a certain time, compensates for the loss of metal which leaks past the Piston, due to wear.

Type Transfer Wedge

425. The Type-transfer Wedge is adjusted first by the Mold-blade-abutment Screw; second, by the Micrometer Wedge.

OBJECT:—To cause the Machine to cast the 18 unit size body as given in the Table of Type Sizes for the set Normal Wedge used.

426. See that the Micrometer-wedge Adjusting-screw is about central to the tip on the Micrometer-wedge Spring. Cast one 18 unit character and measure, to ascertain if it be larger or smaller than the 18 units of the set size used. The difference between the notches of the head of the Mold-blade-abutment-slide Adjusting-screw moves the Screw .002″.

427. Turn the Screw to the right to increase the size and to the left to decrease the size, keeping in mind the Screw variation per notch and subtracting or adding as the need may be until we are at the nearest thousandth.

428. Then with the Micrometer Screw, get the correct size. Turning the Micrometer-wedge Screw to the left raises the Wedge and decreases the size. Turning to the right lowers the Wedge and increases the size. The difference between the notches on the Screw makes a Wedge variation of .0001″.

Space Transfer Wedge

429. The Space-transfer Wedge is adjusted to correspond to the setting of the Type-transfer Wedge.

OBJECT:—That the smallest Justified space may be two units of 12 set less than the 6 unit space with any set Normal Wedge.

430. Place the left end notch of each Justifying Wedge upon the Justifying-wedge Centering Tooth, that is, move the Wedges as far to the right as possible. That is 1–1 Justification on the Keyboard Ribbon will set the Wedges in this position. Use the largest set Wedge in plant.

431. Put on a ribbon perforated to cast Justifying spaces and allow the Machine to cast at least 20 of these spaces with the Space-transfer Wedge in.

Note.:—That when casting these spaces the Normal Wedge is in the 6 unit position and the position of the Justification Wedges have not been changed.

432. Then hold the Shifter-arm-lever Rod out, so that the Centering-pin Lever, on its up stroke will not engage the Rod to lift it. The Type-transfer Wedge will then engage the Normal Wedge and the Machine will cast spaces with a 6 unit body of the set Normal Wedge used. Three of these spaces together should just equal the 18 unit size.

433. Two of these spaces should measure .0369 more than two spaces cast with the Space-transfer Wedge in, that is, .0184, or two units of 12 set for each space.

434. Another angle of presentation. These two Transfer Wedges have the same angle and are brought against the same Micrometer Wedge in casting. There must be a setting of the Space Wedge to the left far enough that when the Space-transfer Wedge is against the Micrometer Wedge, and the Normal Wedge in the

same position that the cast product will be .0184 smaller than when the Type-transfer Wedge is used.

435. Screw out on the Space-transfer-wedge Adjusting-screw which moves the Wedge further to the left to decrease the size of the justifying spaces. Adjust until size is correct, when the Adjusting Screw is locked tight with its Lock-nut.

436. Prepare a Keyboard Ribbon as follows:

Set the Keyboard at 30 ems and put on the Justifying Scale corresponding to the set Normal Wedge in use, then set:

First line 30 em quads.

Second line 5 em quads, ten justifying spaces, bring wheel to even ems and quad to 2 ems of the end of the line and justify.

Third line 5 em quads, 20 justifying spaces, bring wheel to even ems and quad to 2 ems of the end of the line and justify.

Fourth line strike characters of each unit size in regular order and repeat to fill the line without justification.

Fifth line 30 em quads.

437. When these lines are cast, if the Space Wedge is correctly set, the quad size is correct for the set used, all the lines will be of equal length. If they are not of equal length then adjust the Space-transfer Wedge as above described.